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ABSTRACT

This report presents the results of an evaluation of the Cleff Job Matching System (CJMS). The CJMS provides a means by which jobs and job applicants can be matched at the semi- and low-skilled levels in both white- and blue-collar jobs. The CJMS operates by obtaining numerical profiles of both job seekers and jobs, across 16 Dimensions of Work, from self-completed paper-and-pencil questionnaires. The job and job seeker profiles are compared by correlation and difference statistics to rank order matches. The analysis of the validity of the job seeker/job profile match statistics, provided by the CJMS, as a predictor of the retention potential of subsequent job seeker/job matches was undertaken by tracking the retention of 142 job seekers over a period ranging from 14 to 21 months. The CJMS measures were found to provide statistically valid indicators of retention. In addition, interviews conducted with the staffs of manpower and vocational rehabilitation agencies who used the CJMS indicated that these personnel found the CJMS to be useful in assessing individuals and providing vocational counseling. Based on the results of this evaluation, the CJMS should be considered for use in labor exchange activities of the U. S. Employment Service, CETA prime sponsors, and other manpower programs. (Author/RC)

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EVALUATION AND ANALYSIS
OF THE
CLEFF JOB MATCHING SYSTEM

FINAL REPORT

VOLUME I: INTRODUCTION AND SUMMARY

Contract No. B2C 5415

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This report presents the results of an evaluation of the Cleff Job Matching System (CJMS) conducted by Ultrasystems, Inc. for the U.S. Department of Labor. The CJMS provides a means by which jobs and job applicants can be matched at the semi- and low-skilled levels in both white- and blue-collar jobs. The CJMS operates by obtaining numerical profiles of both job seekers and jobs; across 16 Dimensions of Work; from self-completed paper-and-pencil questionnaires. The job and job seeker profiles are compared by correlation and difference statistics to rank order matches. The analysis of the validity of the job seeker/job profile match statistics, provided by the CJMS, as a predictor of the retention potential of subsequent job seeker/job matches was undertaken by tracking the retention of 142 job seekers over a period ranging from 14 to 21 months. The CJMS measures were found to provide statistically valid indicators of retention. In addition, interviews conducted with the staffs of manpower and vocational rehabilitation agencies who used the CJMS indicated that these personnel found the CJMS to be useful in asssessing individuals and providing vocational counseling. Based on the results of this evaluation, it is Ultrasystms' opinion that the CJMS should be considered for use in labor exchange activities of the U.S. Employment Service, CETA prime sponsors and other manpower programs. Volume I presents the findings and conclusions and descriptions of both the CJMS and the evaluation. Volume II contains the technical dissertation.

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(Note: This study was originally contracted for by the Office of Economic Opportunity. The contract was subsequently transferred to the U.S. Department of Labor. The contract number remained the same.)

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ABSTRACT

This report presents the results of an evaluation of the Cleff Job Matching System (CJMS) conducted by Ultrasystems, Inc. for the United States Department of Labor. The Cleff Job Matching System provides a means by which jobs and job applicants can be matched at the semi and low skilled levels in both white and blue collar jobs. In the words of the system's principal developer, Dr. Samuel H. Cleff, the CJMS was developed based on the following basic principle:

> *"In looking for work (as elsewhere in life), people seek out those activities in which they feel they are more likely to be successful. Conversely, they avoid those activities in which they feel less likely to be successful. Occupationally well-adjusted people--those who like what they do and believe they are doing it well--are significantly more likely to do a better job for their employers, and to stay on their jobs longer, than people who are occupationally maladjusted--those who do not like what they do and believe they are not doing well."*

The CJMS operates by obtaining numerical profiles of job seekers and jobs in terms of 16 "Dimensions of Work." These 16 Dimensions of Work are grouped into three behavioral categories: Thing-oriented activites (8 dimensions), People-oriented activites (4 dimensions) and Idea-oriented activities (4 dimensions). Job seeker profiles are obtained from two Self Interview Checklists which are self completed. One Self Interview Checklist is used to obtain the profile which indicates those activities which they, the job seeker, like best and dislike most (i.e., what motivates them positively and negatively); the other indicates those activites which they have done most and done least. These two profiles are called the Preference and Experience profiles respectively. A combined job seeker profile is then obtained by averaging each of the individual dimension scores from the Preference and Experience profiles.

A profile is also obtained which describes the specific requirements of each job in terms of the same 16 Dimensions of Work used in the job seeker profile. The job seeker and job profiles are compared by correlation for similarity and by a difference statistic for major differences. The system operates by calculating the correlation and difference indices between a given job seeker profile and a series of job profiles or vice versa. In this way job seeker-job matches can be rank-ordered in terms of the closeness of the match between job seeker and job profiles. In addition the two job seeker profiles (Preference and Experience) are compared using correlation and a difference to obtain measures of the match between an individual's

preferences and experience. All three profiles consist of positive and negative numerical values for each of the 16 Dimensions of Work. Thus the profiles indicate what the individual job seeker likes and dislikes and has done and not done. The job profile indicates what behavior is most required to do the job right and what behavior is not required or is not desired.

This evaluation of the CJMS was initially based on analyzing the results of an experiment funded by the Office of Economic Opportunity in which the CJMS was used in the job placement activities of eight manpower agencies in the State of New Jersey. Five of these agencies were actually offices of the New Jersey Vocational Rehabilitation Commission. The other three were community agencies providing job placement and training services. Ultrasystems was awarded the evaluation contract in June of 1972 by the Office of Economic Opportunity. The contract was transferred to the U.S. Department of Labor in August of 1973.

The New Jersey/Cleff experiment was set up to provide data for analysis of the results and effectiveness of the CJMS as compared to traditional approaches to job/person matching. The key measures of comparison were referral/placement success and post-placement results (retention, job performance and job satisfaction). Because of problems in the operation of the experiment and in the data collection associated with it, OEO decided to revise the evaluation. The major part of this revision involved the implementation of new experiment under the direction of Ultrasystems. This new experiment was aimed at obtaining sufficient data to analyze the relationships between the CJMS job seeker/job profile indices and the subsequent retention of 150 individuals placed into jobs. The experiment was run in conjunction with four California offices of Project SER. Job seekers who came to SER for job placement and training services were profiled using the Cleff systems Self Interview Checklists. After placement the Cleff job profiles were obtained from the respective job supervisor. The retention of 142 individuals for whom both their profiles and their job profiles were obtained was tracked for a minimum of 14 months. Because of the spread in time in which the profiled individuals were placed the maximum retention period was 21 months.

The analysis of the data obtained from the SER/Cleff experiment lead to the following conclusion:

> *The Cleff Job Matching System provides useful measures indicating the retention potential of people-job matches.*

> The indices provided by the CJMS are significantly related to job retention. In particular, the results show that the Job Match Index (the correlation between the combined job seeker profile and the job profile) is significantly related to the probability that the placed individual will remain employed through the initial period of employment, i.e., over the first 120 days. The results also show that it is the Client Adjustment Index (the correlation between the job seekers Preference and Experience profiles) which relates to long-term retention, i.e., employment lasting over 200 days.

Interviews were conducted by Ultrasystems with the staff of the eight agencies that participated in the original Cleff jobs experiment. These interviews lead to the following conclusion.

> *The Cleff Job Matching System provides information about job seekers that is useful in assessing individuals and providing vocational counseling.*

The validity of the Cleff Job Matching System scores as a predictor of retention potential of job/job seeker matches and the responses of personnel interviewed regarding the system's usefulness lead Ultrasystems to the following conclusion:

> *It is Ultrasystems' opinion that the Cleff Job Matching System should be considered for use in the labor exchange activities of the U.S. Employment Service, CETA prime sponsors, and other manpower programs.*

In addition, it is Ultrasystems opinion that there are facets of the CJMS that warrant improvement. These are discussed in Volume I of the final report.

The final report has been divided into two volumes. Volume I contains a brief introduction followed by the findings and conclusions. In addition, Volume I presents a description of the Cleff Job Matching System and of the evaluation.

Volume II presents the detailed analyses undertaken in this evaluation. The major topics covered are:

1) The attitudes and opinions of the staff of the agencies in New Jersey that participated in the original OEO-Cleff experiment. The organization of these agencies and the manner in which they operated the Cleff Job Matching System is also discussed.

2) Analyses of the New Jersey agency's activity data obtained as part of the OEO-Cleff experiment. This also includes a review of the ADP-PDS documentation and analysis of the New Jersey-Cleff experiment.

3) The organization and operation of the SER-Cleff experiment.

4) Analyses of the data obtained from the SER-Cleff experiment. The primary analyses presented involves the determination of the effectiveness of the CJMS in predicting the resultant retention of job-client matches.

1.0 INTRODUCTION

The Cleff Job Matching System (CJMS) provides a means by which jobs and job applicants can be matched at the semi and low skilled levels in both white and blue collar jobs. In the words of the system's principal developer, Dr. Samuel H. Cleff, the CJMS was developed based on the following basic principle:[1]

> "Underlying the research was a basic, common sense principle, long part of our industrial folklore but never verified scientifically and consistently ignored in practice by both people seeking jobs and employers with jobs to fill.
>
> "The principle is this:
>
> *"In looking for work (as elsewhere in life), people seek out those activities in which they feel they are more likely to be successful. Conversely, they avoid those activities in which they feel less likely to be successful. Occupationally well-adjusted people--those who like what they do and believe they are doing it well--are significantly more likely to do a better job for their employers, and to stay on their jobs longer, than people who are occupationally maladjusted--those who do not like what they do and believe they are not doing well."*

In June 1972 the Office of Economic Opportunity Office of Program Development/Evaluation awarded Ultrasystems a contract to evaluate the Cleff Job Matching System. The contract was transferred to the U.S. Department of Labor, Manpower Administration, Office of Policy, Evaluation and Research in September 1973.

This report presents the results of the evaluation. The report has been divided into two parts. Vol. I contains this introductory section followed by the findings and conclusions, a description of the system and a description of the evaluation. Vol. II presents the technical dissertation.

Before proceeding to the findings and conclusions Ultrasystems believes it is important that the reader have a brief idea of the CJMS and the evaluation. The following two subsections present these brief descriptions.

---

[1] Quote taken from "Job/Man Matching In the '70's," by Dr. Samuel H. Cleff and Robert M. Hecht, in *Datamation*, February 1, 1971. This article is shown in its entirety in Appendix A. The article described both the history of the system's development and its characteristics.

1.1 BRIEF DESCRIPTION OF THE CLEFF JOB MATCHING SYSTEM

The Cleff Job Matching System is based on obtaining numerical scores from job seekers and employers on each of sixteen dimensions of work. These sixteen dimensions are divided into three categories: there are 8 dimensions for Thing-oriented activities, 4 for People-oriented activities and 4 for Idea-oriented activities. The set of 16 numerical dimensions obtained is referred to as a profile. The same 16 dimensions are used on both the job seeker and job profiles.

The 16 numerical dimensions scores are obtained from job seekers via two Self-Interview Check Lists (SICL's). Each SICL consists of fifteen pages with each page containing sixteen activity phrases; one for each of the sixteen dimensions of work. These activity phrases, or behavioral units, consist of a set of words which describe a unique or meaningful activity and a behavior which has some objective. Each phrase consists of a verb and an object. For example with regard to the Thing-oriented dimension Athletic one finds such phrases "Move Furniture," "Bale Hay or Paper," "Do Weight Lifting."

One checklist is used to obtain the scores that indicate what the job seeker likes best and dislikes most (i.e., what motivates them positively and negatively). The second checklist indicates what the job seeker has done most and done least.

For jobs the 16 Dimensions of Work are obtained from job supervisors via a Job Outline Check List (JOCL) and a Job Card Sort. The Job Outline Check List is identical in format to the job seeker Self Interview Check List, but consists of ten pages. The Job Card Sort consists of a set of sixteen cards, one for each of the Dimensions of Work. The front of each card contains a definition of one of the dimensions of work. The back of each card contains examples of the activities that each dimension refers to. The cards are sorted by the supervisor into two sets. One of these consists of five cards that best describe what must be done on the job to do it right. The other consists of five cards which best describe those activities which must be avoided by a worker in the job or are least required by the job. The supervisor then assigns scale values to each of these cards. These values are combined with the scores obtained from the JOCL to arrive at the job profile. The JOCL describes the specific requirements of the job in terms of the 16 Dimensions of Work. The card sort provides a general or global description of the job and serves as an internal consistency check on the job profile obtained from the JOCL.

The two job seeker profiles are referred to as the Likes and Dislikes or Preference profile and the Done and Not Done or Experience profile. These two profiles are combined to obtain a Combined profile. The two basic job seeker profiles are also compared by correlation for similarity and by a difference statistic for major differences in dimensional scores. These two measures are referred to as the Client Adjustment Index (CAI) and the Client Difference Index (CDI). High positive values of the Client Adjustment Index indicate similarity between the persons likes and dislikes and what they have done and not done.

The Combined client profile is compared to the job profile using correlation for similarity and a difference statistic for major differences in dimension scores. These two measures are referred to as the Job Match Index (JMI) and the Job Difference Index (JDI). Generally speaking a high positive Job Match Index and a low Job Difference Index indicate a good match of job seeker and job in terms of the 16 dimensions of work.

A Job Cluster Register is available based on clustering over five hundred individual job profiles obtained via the JOCL and the Job Card Sort. There are 19 clusters or individual job groups in the cluster register. Job seeker profiles are compared to the cluster profiles to obtain client-job matches. The resultant matches can be used to direct job development activities as well as for direct client-job matching when jobs are available that have not been profiled.

The key part of the system in client-job matching is the comparison of the job seekers ombined profile with the job profile. The Job Match and Job Difference indices provide numerical scores that indicate the closeness of the match. The individual dimension scores are also useful in matching. The job seekers Preference and Experience profiles also play a role in job matching independent of job profiles. In addition the numerical indices obtained by comparing the Experience and Preference profiles and the actual profiles themselves (the individual numerical dimension scores) are used in vocational counseling and client assessment.

The CJMS has been developed so that jobs and job seekers are described in the same terms; i.e. according to the sixteen dimensions of work. The numerical dimension scores have positive and negative values indicating activity likes and dislikes, activities done and not done, and job activity requirements, not required or to be avoided.

The checklists are self-administered pencil and paper instruments. The checklists can be administered orally.

For more details regarding the Cleff Job Matching System's development, structure, and validation the reader is referred to Appendices A and B and to Section 3 of Vol. I.

1.2 BRIEF DESCRIPTION OF THE EVALUATION AND ANALYSIS OF THE CLEFF JOB MATCHING SYSTEM

On June 30, 1972, Ultrasystems, Inc. was awarded a contract for the evaluation and analysis of the Cleff Job-Client Matching System by the Office of Economic Opportunity. The project was to use as the source of the information required by the evaluation the activities underway in an experimental program funded by OEO and being conducted in conjunction with eight manpower agencies/offices in New Jersey (three community agencies and five New Jersey Vocational Rehabilitation Offices). The experimental program was run by ADP-Personnel Data Systems, Inc. (ADP-PDS), under contract to OEO.

The experiment had been designed to obtain comparative information between two groups of clients using the participating agencies for job and training placement services. One group of clients would be given the Self-Interview Check Lists of the Cleff System. The other would not be given the checklists, but would be given services in the normal agency manner. The evaluation was to determine if the use of the CJMS to direct referral activities resulted in a significantly improved "level" of referral/placement "success" as evidenced by:

1. A higher rate of successful referral outcomes (greater percentage of referrals resulting in hires or training program enrollments).
2. A significant improvement in post-placement results as evidenced by a higher level of retention, worker job satisfaction and employer rating of worker job performance.

The evaluation involved determining not only comparative performance between the two client groups on the above measures but, in the opinion of Ultrasystems, more importantly in terms of what the CJMS itself predicted, through its scoring system, to be the expected results. That is, the scores relating the client and the job or training program they were referred to and placed in were to be tested versus the results in terms of the above measures. The data relative to retention, on-job performance and worker satisfaction were to be obtained by Ultrasystems through interviews with clients from both groups who were successfully placed and from their respective employers. The data needed to compare referral/placement success and needed to ascertain client/job CJMS scores was to be furnished Ultrasystems (in machine-readable form) by the company contracted to run the experiment.

Shortly after award of the contract, Ultrasystems visited all the participating agencies to directly determine the shape of the experiment currently underway and to examine the data being collected. The results of this effort were presented to OEO in a report submitted in late August of 1972. The report raised some serious questions regarding the manner in which the experiment was being conducted and the extent, form and availability of the data collection activities underway as part of the experiment. Ultrasystems recommended a new approach to the data collection using a data collection form developed by Ultrasystems. Ultrasystems also recommended changes in the client group sample design. Both of these recommended changes were accepted by OEO.

In late November 1972, OEO recommended a revised evaluation scheme. This revised scheme stemmed from continued discussions about the issues discussed in Ultrasystems earlier report. After considerable discussions with OEO, Ultrasystems responded in mid-January with a revised work statement which addressed the evaluation design contained in the November letter and also proposed an optional approach. The option included the implementation and evaluation of a new mini-experiment similar to the original experiment conducted in New Jersey. This new experiment was to be conducted by Ultrasystems in conjunction with four offices of Project SER. The new experiment was approved and provided most of the quantitative data used in this evaluation.

To this point the above discussion has not specifically addressed in any detail the technical activities accomplished by the project. As previously stated, the original evaluation was to assess the effectiveness of the Cleff System in improving the quality of the job-client match as evidenced by referral outcomes and post-placement success; i.e., retention performance and satisfaction. The two key sources of information were:

1) The activity and client data being collected by the contractor running the New Jersey experiment and to be supplied in machine readable form to Ultrasystems.

2) The interviews to be conducted by Ultrasystems covering the following classes of respondents:

    a) Agency staff and management

    b) All clients placed by the agencies who were given the Cleff Self-Interview Checklists

    c) All clients placed who were part of the control group

    d) The immediate job supervisor of each of the clients placed

    e) Personnel offices of companies who hired the clients from (b) above

Under OEO instruction, all the interviews save for the agency staff and management were dropped. The interviews with the staffs of the agencies participating in the New Jersey CJMS experiment were undertaken in early 1973. The results are reported in Vol. II, Section 2.

The analysis of the data collected during the New Jersey experiment was maintained in the revised statement of work. The data was collected by the contractor who ran the experiment. As noted above, the data collection activities were revised as a result of Ultrasystems' initial report. Under Ultrasystems' original contract, all the data was to be supplied in machine-readable form. Along with the Ultrasystems' revisions to the experimental sample design and the design of a data collection form, Ultrasystems also took on the task of keypunching all the data being supplied. Whereas the original contract specified that Ultrasystems would receive the entire data base by October 1972, the data was not completely collected and sent to Ultrasystems until the Spring of 1973. The results of this data analysis did not provide much in the way of quantitative data for use in evaluating the CJMS. This is especially true as regards to the data required for performing a comparative retention analysis and more importantly a retention analysis relating Cleff match scores to subsequent placement retention. The analyses are presented in Vol. II, Section 3.

The basic objective of the SER mini-experiment was to obtain sufficient data to analyze the relationship between the CJMS client-job match scores and the on-job retention for those clients placed by the form participating SER offices. The goal was to obtain at least six months' retention data on 150 clients. Each of the clients for whom retention data was obtained had taken one or both SICL's and each job was profiled using the Job Outline Check List and the Job Card Sort. Job seekers at each of the four SER offices were profiled prior to placement. The jobs were profiled after the previously profiled job seeker began work.

Activities related to the SER mini-experiment began in February 1973. After the mini-experiment concept was defined, the required personnel were trained in the administration and interpretation of the client self-interview check list and the resultant client scoring. Administration of the client checklists to SER enrollees and new applicants began in late March of 1973. As planned, the administration of the checklists continued until the end of June 1973, at which time 571 client checklists had been completed. The activities related to administering the job profiles for those jobs that SER clients who took the Cleff booklets were placed in began in June 1973.

A total of 110 job profiles were obtained from 100 unique employers. These 110 job profiles corresponded to 142 SER client placements. The difference is due to placement of more than one person into the same type of job at the same employer. The earliest hires occurred in the first two weeks of March 1973. The last hires occurred in early October 1973. Retention follow-ups were made at four time points: December 31, 1973; February 28, 1974; May 31, 1974; and December 10, 1974. Thus, the minimum possible retention period was 14 months and the maximum was 21 months.

The SER mini-experiment provided quantitative data used in analyzing the predictive validity of the CJMS using retention time as the criterion measure. No other criterion measures, such as job satisfaction or job performance, were utilized.

The Statements of Work for the New Jersey/Cleff experiment and its evaluation are presented in Appendices C and D. For more details regarding the evaluation methodology, the reader is referred to Section 4 of Volume I.

2.0 FINDINGS AND CONCLUSIONS

The results of the evaluation and analysis of the Cleff Job Matching System led to the following two conclusions:

1) The Cleff Job Matching System provides useful measures indicating the retention potential of people-job matches.

   The indices provided by the CJMS are significantly related to job retention. In particular, the results show that the Job Match Index is significantly related to the probability that the placed individual will remain employed through the initial period of employment, i.e., over the first 120 days. The results also show that it is the Client Adjustment Index which relates to long-term retention, i.e., employment lasting over 200 days.

2) The Cleff Job Matching System provides information about job seekers that is useful in assessing individuals and providing vocational counseling.

The first conclusion stems from the analysis of the relationships between the CJMS client-job scores and on-job retention obtained from the SER mini-experiment. The second conclusion stems from interviews conducted with Manpower and Vocational Rehabilitation personnel in the eight agencies that participated in the New Jersey CJMS experiment.

> *It is Ultrasystems' opinion that the Cleff Job Matching System should be considered for use in the labor exchange activities of the U.S. Employment Service, CETA prime sponsors, and other manpower programs.*

2.1 FINDINGS: VALIDITY OF THE CLEFF JOB MATCHING SYSTEM AS A PREDICTOR OF RETENTION

The predictive validity of the Cleff Job Matching System was analyzed using the resultant job retention of individuals who had, prior to placement, taken one or both of the Self-Interview Check Lists. The Cleff system's job profiles were obtained from the respective employers (i.e., where the individuals had been placed) after the individual was hired. In some cases, these job profiles were obtained after the person had terminated. No criterion measures other than job retention were obtained.

Two separate types of analyses were undertaken to determine the predictive validity of the CJMS, using retention as the criterion. These two types of analyses are as follows:

- Statistical analyses of the differences between client and job-match indices for client groups obtained by grouping those clients who worked less than or equal to "X" days and those who worked longer than "X" days. The analyses were done for five values of "X"; e.g., 30, 60, 90, 120, and 199 days. In addition, the same analyses were done between those clients who terminated prior to December 10, 1974 and those who were still working as of this date.

  These analyses are referred to as the Truncation of Time Worked Analyses.

- Multiple regression analyses using days worked as the dependent variable and the client adjustment and job match indices as the independent variables. Two analyses were done, one of which involved the 71 people who took both SICLs and who terminated prior to December 10, 1974. The other one utilized all 110 cases where both SICLs were taken and assigned a random future termination time to the 39 people of this group who were still working as of December 10, 1974. In addition, the effect of the restriction on known days-worked-till-termination was estimated, using a statistical methodology.

These two analyses were initially done independently of the reason for termination. The first analyses were then redone considering the termination reasons.

Before presenting the results of these analyses, the following points are presented as a brief review of the key aspects of this part of the evaluation:

1) The retention of the 142 people included in our sample was obtained by telephone contact with the respective employers. These telephone contacts were done at four time points, i.e., December 31, 1973; February 38, 1974; May 31, 1974; and December 10, 1974.

2) The employer was asked if the person was still working and if the response was No then the date terminated and the reason for the termination was obtained. No questions were asked regarding job or salary changes.

3) The sample of 142 people consisted of one group of 110 people who completed both SICL booklets and 32 people who only completed the Preferences (Likes and Dislikes) SICL.

4) As of the last retention followup (December 10, 1974), 94 of the 142 people had terminated (66.2%). Twenty-eight terminated after working 30 or less (calendar) days (approximately 30% of all the terminations), and 47 people terminated after working 90 or less (calendar) days (50% of all terminations).

5) The 142 people were hired into their respective jobs over a seven-month time period, i.e., from early March 1973 to early October 1973. Thus, the maximum and minimum retention periods could be from approximately 21 months to 14 months, respectively.

6) No information was obtained from the people themselves nor was any other data regarding their job performance (other than their retention) obtained.

2.1.1 Truncation of Time Worked Analyses

Tables 2-1 and 2-2 show the results obtained from the analysis of the observed retention (measured in calendar days from the date of hire to the date of termination) of the 142 individuals and the scores (indices) obtained from the Cleff Job Matching System. Table 2-1 shows the mean indices scores for client groups who worked less than or equal to X days or greater than X days. The values of X (i.e., job retention time) selected for the analysis are as follows:

A) 30 days
B) 60 days
C) 90 days
D) 120 days
E) 199 days

Table 2-2 shows the mean indices scores for those clients who terminated prior to the last retention followup point (December 10, 1974) and those who were still working as of that time. The average length of time worked for the 94 individuals who terminated prior to December 10, 1974 was 127.8 days. The average length of time worked for the 48 individuals who were still working as of December 10, 1974 was 548.4 days.

The data shown in Table 2-1 indicate that there is a statistically significant relationship between the Job Match Index and the probability that the person will remain employed over the initial 120 calendar days from the date of hire.

TABLE 2-1. ANALYSIS OF CLIFF SYSTEM SCORES VERSUS LENGTH OF TIME WORKED: TIME WORKED CATEGORIZED IN DISCRETE INCREMENTS (I.E., FIXED TRUNCATION POINTS)

Note: (1) The data shown for the CAI and CDI is for 110 clients.

(2) The data shown for the JMI and JDI is for 142 clients.

(3) Indices are actual values

Job Retention Times (In Days)			CAI	CDI	JMI	JDI
(A)		$\bar{x}$	26.4	1512.4	14.2	2274.0
	0-30	s	36.6	833.9	31.6	949.6
		n	23	23	28	28
		$\bar{x}$	39.9	1210.7	32.8	2129.2
	> 30	s	35.9	721.2	26.9	870.6
		n	87	87	114	114
		t	1.60	-1.73	3.16	-0.77
		*Sig.	-	+	+++	-
(B)		$\bar{x}$	25.3	1488.2	13.7	2396.6
	0-60	s	38.5	798.0	32.0	1071.2
		n	30	30	38	38
		$\bar{x}$	41.5	1193.3	34.8	2070.5
	> 60	s	35.1	726.5	26.3	810.9
		n	80	80	104	104
		t	2.10	-1.85	3.99	-1.94
		Sig.	+	+	+++	+
(C)		$\bar{x}$	33.4	1356.9	17.3	2364.3
	0-90	s	35.7	744.9	31.2	1038.6
		n	36	36	47	47
		$\bar{x}$	38.9	1233.3	35.0	2055.5
	> 90	s	36.1	746.8	26.2	805.0
		n	74	74	95	95
		t	0.75	-0.82	3.55	-1.95
		Sig.	-	-	+++	+
(D)		$\bar{x}$	31.1	1340.5	19.7	2296.5
	0-120	s	38.2	758.8	30.5	1008.0
		n	41	41	54	54
		$\bar{x}$	40.7	1234.1	34.9	2072.6
	>120	s	34.8	739.3	26.3	808.9
		n	69	69	88	88
		t	1.35	-0.72	3.14	-1.46
		Sig.	-	-	++	-
(E)		$\bar{x}$	27.1	1447.6	25.6	2154.4
	0-199	s	37.1	794.0	29.2	928.4
		n	55	55	74	74
		$\bar{x}$	47.2	1100.0	32.9	2161.4
	> 199	s	35.4	704.3	26.8	852.7
		n	55	55	68	68
		t	2.91	-2.43	1.55	0.05
		Sig.	++	++	-	-

Significance Code: - = difference between means not significant
+ = " " " significant at 95% confidence level
++ = " " " " " 99% " "
+++ = " " " " " 99.9% " "

TABLE 2-2. ANALYSIS OF SCORES (INDICES) FOR THOSE PEOPLE STILL WORKING AS OF DECEMBER 10, 1974 AND THOSE WHO TERMINATED PRIOR TO THIS TIME

Status as of 12-10-74		CAI	CDI	JMI	JDI
All	$\bar{x}$	29.1	1459.3	26.1	2201.5
Terminated	s	37.3	786.1	28.9	933.4
	n	71	71	94	94
All	$\bar{x}$	51.8	936.1	34.9	2072.1
Still	s	35.3	701.1	27.0	827.2
Working	n	39	39	48	48
	t	3.11	-3.47	1.75	-0.81
	sig	++	+++	+	-

(NOTE: See Table 2-1 for significance codes.)

The optimum level of truncation for the JMI appears to occur at about 60 days. As can be seen in the two tables, the value of "t" for the t-test for the JMI is maximum at this level. Also, it is the only level at which all 4 indices are judged simultaneously to be significantly different.

The CAI and CDI indices appear to pass through an initial optimum also at 60 days; however, there is also a long-term effect which becomes even more significant at 199 days and is maximal at the time of the last employment status check. This is more clearly seen by the t-tests, which compare all "terminated" versus all "still working" as of December 10, 1974, as shown in Table 2-2.

All of the people who terminated prior to this time had an average CAI of 29.1 compared to an average of 51.8 for those still working. The JMI comparison, although significant, had a much smaller difference (26.1 versus 34.9 for the still-working).

- FINDINGS

  The data indicates that although both CAI and JMI are related to job retention, it is the CAI which relates to long-term employment potential while the JMI is the important measure of surviving the initial period of employment, particularly during the first three months.

2.1.2 Multivariate Regression Analysis

In order to further delineate the relative long-term effects of the CAI and JMI on job-retention time, the following multiple regression analyses were conducted using the final set of retention data obtained as of December 10, 1974.

1) Using only the 71 cases where the termination time was known (people had terminated) and the people involved had taken both SICLs.

2) Using all 110 cases where both SICLs were taken with those "still working" assigned a random future termination time based on an estimated exponential termination time delay function.

The analyses of variance resulting from the above regressions are presented in Table 2-3.

TABLE 2-3. ANALYSES OF VARIANCE FOR RETENTION TIME MULTIPLE REGRESSIONS

Y = (days worked)$^{1/2}$

X_1 = CAI

X_2 = JMI

(1) Using TERMINATION DATA ONLY (N = 71)

SOURCE	Degrees of Freedom df	Sum of Squares ss	Mean Square ms	F	SIG*
X_1 [CAI]	1	1.48	1.48	1	-
X_2 [JMI]	1	24.89	24.89	1	-
Resid	68	2408.19	35.41		
Total	70	2434.56			

MULTIPLE CORRELATION COEFFICIENT $\boxed{R = 0.104}$

(2) Using ALL DATA (N = 110)

Note: "Still-Working" Terminations Randomly Assigned Calendar Days Employed To Termination From Exponential Time Decay Function

SOURCE	df	ss	ms	F	SIG.*
X_1 [CAI]	1	1224.28	1224.28	9.94	++
X_2 [JMI]	1	357.79	357.79	2.91	-
Resid	107	13178.54	123.16		
Total	109	14760.61			

MULTIPLE CORRELATION COEFFICIENT $\boxed{R = 0.327}$

*Significance Code:

- = Source of variance NOT significant

+ = Source of variance SIGNIFICANT @ 95% Confidence Level

++ = Source of variance SIGNIFICANT @ 99% Confidence Level

It was not considered to be statistically appropriate to include the "still-working" times with the "termination" times in a composite regression analysis due to the fact that the resulting distribution of days worked is being bounded on the upper end by the date when we did our last followup.

In an attempt to overcome this problem, use was made of an exponential life-testing model. The job-retention times were seen to behave more or less in the same way as a life-testing decay. Thus, an exponential time decay function was fit to all 94 cases who had terminated. The basic exponential distribution is given by a probability density function having only one parameter which is termed the "mean life" or the "mean time between failure." One obtains the estimated value for this parameter by taking the total calendar days worked by all clients (both terminated and still working) and dividing this by the total number of terminations observed. The estimated value was 407.8 days per termination. Using this value, one then estimates the cumulative exponential decay function and determines the probability that a client, in this case the clients still working as of December 10, 1974, will have been employed the length of time that they were observed to be employed. Multiplying this probability by a random number, one obtains a "random" point in the total remaining probability scale for total time worked, which is greater than the observed time worked for those clients still working. One then obtains the random future termination time, which is assigned the still-working client as an estimate of total days employed until termination. (The reader is referred to Section 5.4.4 of Part II for a more complete description of this approach.)

Using the random termination times for each of the "still-working" cases, the second regression was conducted using the resulting 110 case composite groups, i.e., the actual terminations and the estimated.

As a further measure of the effect of "restriction" on the first data set, which used only the job-terminated cases, an "unrestricted" estimate of the correlation was performed using a correction formula.[1]

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[1] J.R. Guilford, *Fundamental Statistics in Psychology and Education*, 4th Edition. New York: McGraw-Hill, c. 1965, pp. 341-45. (See Section 5.4.4 of Part II for a more complete description.)

If one takes the "restricted" correlation estimate of 0.104 and uses the estimated ratio (1.97) of the unrestricted standard deviation (based on the randomly extended exponential retention times) to the restricted standard deviation (using terminations only), the corrected estimate of correlation becomes:

$$R_{12} = 0.202$$

Although this is not as large as the actual computed correlation using the estimated extended times, it does represent about a factor of two times the original correlation observed using terminations only. The reason it underestimates the actual is probably due to the fact that the data points absent from the restricted case are heavily weighted with high values of the CAI.

- FINDINGS

  In the first analysis, neither of the indices is significantly related to retention time. The reason for this would appear to be that the effects of JMI on early termination (as noted in the earlier t-test analyses) has been diluted by the addition of the long-term termination data; while the "long-term" effect of the CAI cannot be seen since a considerable number of those with very high CAI are in the "still-working" category, and hence were not included in this particular analysis.

  The results of the second regression analysis indicate the expected result as previously seen in the t-test; that for long-term job retention, it is the CAI index which is statistically significant.

  Using the correction formula to estimate the effect of retention in range on days worked results in a computed correlation coefficient not as large as obtained using the estimated extended times. The correlation obtained is about a factor of two times the original correlation observed using terminations only. The reason it underestimates the actual is probably due to the fact that the data points absent from the restricted case are heavily weighted with high values of the CAI.

2.1.3 Findings of the Analysis of the Reason for Termination and the Relationships of the Cleff System Scores to Retention

As stated earlier, the analyses just described were done independently of the reason for termination. Table 2-4 shows the termination reasons, given by the employer, and the distribution of calendar days worked by the people terminated for each reason.

Examining the reasons for termination, one sees that there are many cases in which the exact reason is not discernible. As an example, one sees that the largest category of terminations by reason is "Quit No Reason Given" (i.e., there were 17 terminations in this category, which is 18.1% of the total of 94 terminations). In addition, there were two (2) terminations for which no reason was given by the employer (labelled INA in Table 2-4 , line 13), and there were 10 terminations for which the reason given was either Voluntary Termination or Terminated By Company-No Reason Given. Thus, there was a total of 29 terminations (30.8% of the total terminations) for which the "real" reason is not clear. In other words, the reason for these terminations could have been the same as another reason listed; i.e., Quit-No Reason Given could have been a reason such as Didn't Like Job or Quit To Go To School or Quit To Get Married, etc.

In addition to this problem, there is of course the question of the real validity of these reasons. As stated, these reasons were given by the employer. Since the people themselves were not contacted, no check on the reason is available. One should note that whereas also obtaining a reason for termination from the person would be a great help, it is, in Ultrasystems' opinion, likely that in many cases the reason given by the person will differ from that given by the employer. As an example, the employer reason Did Not Qualify might be contradicted by the person giving a reason such as Didn't Like the Job or The Company or Their Supervisor. That there would have been a difference in perspective between the two respondents is, as stated, our opinion, and is obviously not supported by any data we obtained.

Aside from these two issues, the reasons for terminations given also show that there were two people who never reported for work, four who were terminated when the business closed, and seven who terminated because of lack of work (or financial problems), and four who were hired on a temporary basis.

TABLE 2-4. TERMINATION REASONS AND DISTRIBUTION OF DAYS EMPLOYED BY SUCH REASON

Line Number	Termination Reason	Ultra Code Nos.	Total Term.	Calendar Days Employed								
				0-30	31-60	61-90	91-120	121-199	200-299	300-399	400-499	500-599
1	Did Not Qualify	12	8	4		2			1	1		
2	Not Dependable	16	3			1	1			1		
3	Didn't Like Job	17	1	1								
4	Personality Problem	30	1					1				
5	Abseenteeism And/Or Tardiness	7,8,28	6	2	2	1						1
6	Quit-No Reason Given	13	17	7	3	1	2	3	1			
7	Voluntary Termination	24	6					3	1	1	1	
8	Terminated By Company-No Reason Given	26	4	2		1					1	
9	Never Reported For Work	1	2	2								
10	Business Closing	5	4	3								
11	Laid-Off Lack of Work	4	6			1	2	3				
12	Company Had Financial Problems	27	1		1							
13	INA	22	2	1						1		
14	Temporary Hire	20	4					2	2			
15	Found Better Job	11	3				1			1		1
16	Quit To Go To School	25	4		1			1	1		1	
17	Went Into Own Business	19	1		1							
18	Went On Personal Leave-Never Came Back	21	1			1						
19	Went On Personal Leave-Took Too Long Coming Back	18	2					1	1			
20	Personal Reasons	6	5	2				2	1			
21	Left Area	14	3	1				2				
22	Quit To Get Married	10	4	1	1	1		1				
23	Pregnancy	29	1						1			
24	No Driver's License	2	1		1							
25	Language Problem	31	1					1				
26	Violated Probation	23	1				1					
27	Falsified Birth Cert.	3	1		1							
	Total			28	10	9	7	20	9	6	3	2

The key issue here has to do with the measures about the person, the job, and the match between them that the CJMS is designed to provide and the inclusion in the data base of employment histories where the reason for termination is independent of the system measures. Because of the relatively small number of total cases in the data base, it is, in Ultrasystems' opinion, extremely important that one examine the effect on the retention-system score analyses of the terminations due to causes not associated with the measures provided. In other words, the people terminated because the company shut down the plant would apparently have been terminated no matter how well they were performing on the job. Because many of the termination reasons are not that clear and because the reasons were obtained only from the employer, the disaggregation of the data base by reason for termination is subject to question. Given the benefit of hindsight, it appears that the analysis would have gained considerably from the capture of additional data. In addition to obtaining the person's reason for termination, it would have been valuable to obtain measures of job performance from the employer. These measures were part of the original evaluation design specified for the New Jersey experiment's evaluation. That they were not included in the SER experiment's evaluation is unfortunate. It should be noted that SER stated as a groundrule for their participation that Ultrasystems was not to contact their clients. However, measures of job performance could have been obtained from the employer.

The findings and analyses presented earlier have shown that statistically significant relationships were found between the eventual retention of a person and the measures about the person and their match to the job provided by the Cleff system. It is important, therefore, to determine if these statistically significant differences still hold if the people who were terminated for reasons that appear on face value to be independent of the measures provided by the CJMS are removed from the data. In other words, it is possible that the system scores for the people terminated for such reasons as Laid Off-Lack of Work and Business Closing could, by chance be biasing the results given the absence of any causal relationship between the reason the person was terminated and the person's behavioral association with the job.

Analyses were undertaken to determine what effect removing sets of clients, based on the reason for their termination, would have on the results obtained earlier, i.e., from the truncated analyses done independently of the termination reason. The reader is referred to Section 5.4.5 of Vol. II for the details of these analyses. The findings obtained are given below.

- FINDINGS

The predictive validity of the CJMS Client Adjustment Index in measuring the long-term retention probability of client-job matches was not affected by the cases excluded. The results obtained using all the data independently of termination reason for the predictiveness of the Job Match Index in the short term were significantly affected by the cases excluded.

In Ultrasystems' opinion, the exclusion of the four clients who were terminated when the business closed the plant where they were employed is the clearest set of exclusions. The results obtained on this case show that the short-term predictive validity of the JMI was not significantly reduced.

The termination reason data obtained by Ultrasystems is not sufficent to enable one to disaggregate the data base into terminations based on their degree or level of job-relatedness.

2.2 FINDINGS: OPINIONS OF USERS OF THE CLEFF JOB MATCHING SYSTEM

Interviews were conducted with the professional staff and management of the eight agencies that participated in the New Jersey Cleff experiment. One of the objectives of these interviews was to obtain the attitudes and opinions of these CJMS users regarding the usefulness of the system. This section summarizes the findings obtained.

The eight agencies which participated in the New Jersey experiment consisted of three community-type agencies and five Vocational Rehabilitation (VR) offices of the New Jersey Rehabilitation Commission. These agencies are listed below:

Community Agencies

1) Business and Industrial Coordinating Council (BICC)

2) Typing and Office Preparatory Skills Training Program (TOPS)

3) Field Orientation Center For Underprivileged Spanish (FOCUS)

Vocational Rehabilitation Agencies

4) Atlantic City Vocational Rehabilitation (AVCR)
(Cape May, New Jersey Outreach Office, CMVR)

5) Atlantic City Model Cities (ACMC)

6) Jersey City Vocational Rehabilitation (JCVR)

7) New Brunswick Vocational Rehabilitation (NBVR)

8) Perth Amboy Model Cities (PAMC)
(Diagnostic and Employment Center; State of New Jersey Rehabilitation Commission)

The abbreviated title for each agency is used in presenting the findings. The Atlantic City Model Cities (ACMC) and the Cape May Vocational Rehabilitation (CMVR) are actually outreach offices of the main Atlantic City VR office.

Response to the system in all agencies visited was strong and it appears that, conceptually, CJMS has much to recommend it. However, mistakes were made in its introduction and operation which placed constraints upon its acceptance. Where these constraints did not work against acceptance, use was made of CJMS. In some agencies, however, these constraints acted to obviate acceptance which in turn caused the user staff to dwell on these constraints to the detriment of the system.

Favorable opinions regarding the usefulness of the CJMS were obtained from staff at BICC, TOPS and the Atlantic City VR offices. These agencies accounted for over 80% of the 2,600 experimental group clients from the New Jersey Cleff experiment.

The responses obtained from the other Vocational Rehabilitation agencies were generally negative. It is Ultrasystems' opinion that problems associated with the manner in which the CJMS was introduced and technical assistance provided hindered the acceptance and effective use of the CJMS by the other Vocational Rehabilitation agencies. FOCUS did not make much use of the CJMS and hence staff personnel did not have any meaningful opinions of the system's effectiveness.

The following subsections present some of the key findings from each agency obtained from the field interviews. Where appropriate brief descriptions of each agency's operations are given. The Vocational Rehabilitation agency personnel responses are generally discussed as a group with the exception of the responses obtained from the Atlantic City offices.

The responses are presented in a narrative form.

2.2.1 Findings From Interviews Conducted At BICC

All the BICC personnel interviewed, including several former counselors no longer associated with the agency due to budget cutbacks, had very favorable opinions about CJMS. The counselors at BICC used the CJMS as a basis for selecting people for job referrals and for training programs that BICC conducted. The counselors used SICL results in counseling sessions and felt that the information provided by the SICL considerably shortened the time required for counseling. CJMS was used as a diagnostic tool and was thought to be more useful than the Kuder or Minneapolis. It helped the counselors reduce categorization errors such as occur when a client neglects to tell the interviewer of some significant past experience or when a single DOT code is assigned to an individual with a broad work experience.

In one instance, BICC administered the SICL at a nearby high school. The students were not interviewed beforehand and the SICL was administered en masse. BICC stated that the school found the SICL to be accurate and useful for providing the students vocational counseling.

BICC counselors felt that use of CJMS resulted in a significant amount of time saved in the counseling process, since it reduced the time required for fact finding and helped the counselor set client service objectives fairly soon in the counseling process.

BICC was the first of the agencies to use CJMS. They were instrumental in introducing CJMS to OEO and participated in at least two revisions to the system. BICC also appeared to have received the most attention from ADP-PDS in the form of technical assistance. This history could have given BICC almost a proprietary interest in seeing CJMS accepted.

BICC administered more SICL's than all of the other seven agencies combined, accounting for almost 60 percent of all SICL's in the experimental group. In addition, BICC was the only agency to JOCL jobs and to establish a CJMS job bank. It placed more people from the experimental group into jobs than any of the other agencies (approximately 42 percent of the total).

2.2.2 Findings From Interviews Conducted At TOPS

TOPS provides MDTA training in office and secretarial skills and counseling and job development services for its students. Since it is primarily a training institution, services are restricted to those accepted for training and are primarily training-related.

TOPS has used the CJMS to supplement its regular screening process; viz., applicants for training are interviewed, tested to determine educational level (Metropolitan Achievement Test) and interest (CJMS), and accepted or not accepted for training. Persons referred by CEP are accepted and assigned training regardless of findings during screening as a result of contractual obligations.

TOPS felt they could tell from the SICL whether the person referred by the CEP was motivated sufficiently to complete the training (in addition to being suitable for such training). Although TOPS tried to have the CEP withdraw or change what the SICL indicated was an inappropriate referral, they were unsuccessful. TOPS felt this CEP refusal to change or withdraw the referral was somewhat burdensome, since the individual generally dropped out before completion of training.

Once an individual was accepted for training, TOPS provided counseling services designed to help the client continue in the training and to help the client prepare for a job in the area in which he was being trained. The counselor felt that the SICL results, especially the "People-oriented" parameters, were very useful in counseling at this point. Another benefit cited for CJMS was that it forced TOPS to improve their training. Since CJMS helped TOPS pick the best people, the training standards had to be raised a corresponding amount.

TOPS staff stated that they felt very definitely handicapped without CJMS and, if they had the money, would start using it again.

2.2.3 Findings From Interviews Conducted At ACVR

The Atlantic City offices have been able to make extensive use of CJMS, although it appears that the counselors are still probing to determine the limits of the system. Cape May counselors, for example, can interpret the CJMS results but feel they need more experience interpreting in order to be able to derive the maximum amount of information from the results. Nevertheless, they have found that CJMS results provide them with a direction in counseling. This helps them get into effective counseling more rapidly, since it speeds up the fact-finding portion of the counseling period and helps avoid some counseling blind alleys. In addition, the Cape May counselors feel the CJMS results serve as a good tool for determining a need for a psychological or psychiatric examination. Note that the CJMS is not used as a psychological diagnosis but rather as an indicator that such diagnosis may be warranted.

Similarly, ACVR and ACMC counselors feel that CJMS gets them into counseling faster by providing a shortcut to fact finding. These counselors feel CJMS has some advantage over psychological examinations in that it breaks down client/job-related characteristics into more specific areas. This enables them to establish counseling and vocational objectives faster. They find the CJMS especially useful for working with the mentally retarded, since they feel that standard I.Q. tests provide meaningless results, whereas the CJMS helps this client express his interests and vocational strengths.

One counselor stated that she used the SICL as a quick I.Q. test to determine if a client should be sent to college. A psychological test is still conducted since this provides an I.Q. score which must be used to justify the decision for the record. In general, Atlantic City counselors liked the speed with which they could obtain usable results. They could get SICL results back in the same day or within a few days, whereas it could take up to a week before a client could meet with a psychologist and up to three weeks before the psychologist's report could be received.

While Atlantic City counselors did not notice a reduction in time required for counseling, some did think that CJMS helped them to set counseling objectives sooner than they might have without CJMS.

The Atlantic City Vocational Rehabilitation agencies had elected to continue using CJMS and had budgeted funds for CJMS. This was the only agency that had elected, at the time of the interviews, to purchase the system and allocate funds for its operation.

2.2.4 Findings From Interviews Conducted At FOCUS

FOCUS does not appear to have made much use of the SICL results. They called in the respondent and went over the results with him. They found most people who took a SICL anxious to find out the results but were unable to make much use of the results. Lack of facility in English and no training stipends limited clients in the training and jobs they would accept or could expect to get. FOCUS felt that the SICL was useful in helping some clients make up their minds for the future but, due to the limited resources available to them (or FOCUS), the SICL was not applicable. Most referrals of clients to jobs were made on the basis of the client's prior experience, not the SICL.

2.2.5 The Vocational Rehabilitation Agencies: General Observations And Findings From The Interviews

At the Vocational Rehabilitation agencies the counselors assess the individual's eligibility for service and determine what services to offer the client. The counselor may require the client to undergo any of a number of diagnostic services in order to ascertain appropriate remedial services. CJMS was accepted by the agencies in this study as another diagnostic service to add to their repertoire.

The counselor thus could select the CJMS SICL as one of the diagnostic services to offer a client. The SICL could be administered at any time during the client's tenure of service at the counselor's discretion. The counselors are therefore the key to the use of CJMS in the Vocational Rehabilitation offices. In Ultrasystems' opinion, ADP-PDS initially had problems communicating to the Vocational Rehabilitation offices selected to participate in the experiment what the experiment was about and whom it was to serve. About two months after the installation of CJMS, the Vocational Rehabilitation offices held a meeting to clarify these issues, and the New Jersey State Vocational Rehabilitation Director instructed the office managers to use the system. No additional staff was allocated to administer or process the SICL's. This caused objections, since the offices already felt that they were understaffed. ADP-PDS conducted at least three training sessions for the staff of these offices, but failed to convince many of the counselors of the value of the system as compared to other diagnostic services then available. These difficulties, plus related difficulties discussed below, posed a severe handicap to CJMS. The handicap was severe enough in one office (Jersey City) that, except for some experimentation, CJMS was not used.

Another limitation to the use of CJMS in the Vocational Rehabilitation offices lies in how the offices perceive their mission. They are not employment offices and have no full-time job developers. Job development is usually performed by counselors through their own contacts or through referrals to other agencies such as the Employment Service. Individuals entering with medical problems tend to get services designed to alleviate the specific diagnosed complaint. Unless employment requires special considerations on the part of the employer, as with mentally retarded persons, or is considered part of required treatment, as with drug addicts, or is easily attainable, the client is not usually given much help in finding employment. The client in this case will be referred to the Employment Service or returned to the agency which referred him in the first place. Thus, one of the offices felt that most of its caseload "were medical problems and not employment problems."

All of the Vocational Rehabilitation offices, with the exception of the Perth Amboy Model Cities (PAMC) office, contract with outside professionals for diagnostic services. PAMC alone has its own extensive vocational evaluation unit and, as such, was considered to be a pilot project of New Jersey Vocational Rehabilitation.

A psychological or psychiatric diagnostic report usually consists of several pages of narrative describing tests given, the test results, results of personal interviews (including some background data which may or may not have been uncovered by the counselor), descriptions of clients' reactions during the examination period, summarizing conclusions, and suggestions for a future course of action. The SICL provides a set of experience, preference, and combination scores, measures of correlations and differences for these scores and, if requested, matches to jobs or clusters with appropriate scores and measures of correlation and difference. A manual is provided by ADP-PDS which defines each of the scores and the measures of correlation and difference and provides information on how to use these scores and measures. The clusters accompanying a SICL match suggest a number of jobs the client might do best.

In the psychological or psychiatric narrative, much of the interpretation of tests and correlation of data has been done for the counselor by the examiner and this information is arranged so as to support the examiner's conclusions. Each of the Vocational Rehabilitation offices, except for Perth Amboy, expressed dissatisfaction with the presentation of SICL results.

The senior counselor at the Jersey City VR felt that compared to the psychological evaluation, CJMS "was a joke ... (you) can get all the information that (CJMS) gets from the interview." Both the New Brunswick and Cape May VR offices complained of the time required to interpret the SICL. Each of the offices stated that it required time to learn how to interpret the SICL, experience in the job market in order to be able to relate the clients to the job market, knowledge of the jobs actually available to their clients, and experience with CJMS in order to understand CJMS well enough to use it as a diagnostic tool.

The Jersey City Vocational Rehabilitation (JCVR) office felt that CJMS was inferior to the quality and sophistication obtainable from their consultants. NBVR similarly saw no advantage to using the CJMS because of the expenditure of their own time to administer the SICL, the quality of interpretation, and the time required to obtain results when they mailed the SICL for scoring. JCVR stated that they gave SICL's and psychologicals to two clients and that the psychologicals were "much more revealing and informative."

Atlantic City VR had reduced the problem somewhat by having the ADP-PDS technician chart the results. The charting is simply a clarification on the presentation of SICL results and counselors still expressed preferences for the psychological narratives.

Perth Amboy MC presented the results of the tests performed by its evaluation section on an overall score sheet which includes the evaluation of the results of all the tests including the SICL. The majority of counselors and evaluators felt insecure in interpreting the SICL's since they don't fully understand the specific meaning of the parameters or statistical base for determining the validity of these parameters. PAMC evaluators and counselors feel that CJMS may be somewhat useful for inexperienced persons with no idea of direction, but that they would rather spend the time interviewing the client.

Some counselors questioned how the SICL could be interpreted at all for some clients and gave as examples clients whose point of reference was so low that they had never heard of some phrases. The counselors agreed that lack of knowledge might indicate lack of interest, but they pointed out that each page of the SICL contained many such phrases.

2.2.5.1 Comments Regarding Acceptance Of The CJMS By Vocational Rehabilitation Personnel

The objective of the interviewing was to determine how CJMS was used, what impact it had on staff/client relationships, and to gain insights into how the system could be used and whether these uses appeared to be effective. The purpose was to evaluate the system and not the agencies using the system or the services being supplied.
These objectives held up in the interviews with the community agencies but collapsed in the Vocational Rehabilitation agencies as it became evident that there were problems external to CJMS that were having deleterious effects on CJMS usage.

It appears, for example, that CJMS was imposed upon the Vocational Rehabilitation agencies in the experiment and that they were virtually ordered to use CJMS by their State Director. We have no direct evidence to support this conclusion other than cautiously worded statements from staff members which seem to imply this. In addition, it appears that some of the personnel responsible for introducing CJMS acted boorishly and tactlessly with Vocational Rehabilitation staff persons and that the manner in which technical assistance was provided only made problems worse.

In one office staff members complained vehemently of the treatment they received from ADP-PDS staff members. They told of 1) brisk responses from ADP-PDS to their questions; 2) calling ADP-PDS offices in New York and not being able to get someone who could answer their questions or of not receiving answers after being told that someone from ADP-PDS would call back with an answer; 3) receiving CJMS materials with what they considered inadequate instructions as to their use and then not being able to obtain clarification in writing or through the personal appearance of a Technical Advisor. Staff members conceded that these experiences possibly had a negative effect on their opinion and ability to use CJMS.

In Atlantic City, staff members spoke freely of CJMS but were reluctant to discuss the personality conflicts other than to acknowledge that they knew of the existence of these problems. The staff did mention difficulties in getting technical assistance with respect to CJMS until they had actually purchased the system at the end of the experiment.

It is believed by Ultrasystems that the conflicts caused by these problems hindered the acceptance and effective use of CJMS by the Vocational Rehabilitation agencies. Why Atlantic City was not affected by these problems is unknown. What the Vocational Rehabilitation agencies' experiences with and attitudes toward the system would have been had these problems not existed is unknown.

2.3 GENERAL OBSERVATIONS AND OPINIONS: USE OF THE CLEFF JOB MATCHING SYSTEM IN MANPOWER OPERATIONS

The observations and opinions to be presented in this section are concerned with the use of the CJMS in manpower operations. They are based on Ultrasystems' observations of the CJMS being used in manpower agencies and on our own experiences derived from the SER/Cleff experiment. The topics to be discussed are as follows (there is no relative importance inferred by the order):

1) The time needed to complete the checklists.

2) The self-completion aspects of the SICL and the JOCL.

3) The use of the Cluster Register.

4) The instructions and explanations available regarding the interpretation of the system's scores.

5) Other operational aspects of the use of the CJMS.

6) The impact on agency performance and procedures.

2.3.1 Time Necessary for Completion of Self-Interview and Job Outline Checklists

Our observations and experiences indicate that it requires between one and two hours for the completion of both SICL booklets and approximately one hour for the completion of the JOCL. There are no pre-set time limits associated with checklist completion. These estimated times are based on completing two 15-page SICLs and the 10-page JOCL plus card sort. The times also include giving the instructions regarding the mechanics of completion.

Ultrasystems has no experiences associated with administering more than one JOCL at a time. There are three possibilities here, as follows: 1) where a number of supervisors each complete a JOCL for a given job at the same time; 2) where a number of supervisors each complete a JOCL for different jobs at the same time; and 3) a mixture of the two. It is Ultrasystems' opinion that possibility 1 (one job - more than one supervisor) is the most amenable to group JOCL completion.

Ultrasystems is aware of and has observed the use of shorter SICLs, i.e., 10 pages per booklet instead of 15. We have never seen any data regarding the effect of partial SICL completion, nor have we analyzed the data collected in this project in this regard. It is important to note that many of the SICLs associated with the SER experimental data base were not fully completed. All SICLs utilized in the data base had at least 10 completed groups per SICL. Ultrasystems is not aware of the use of shorter JOCLs nor have we analyzed the job profiles completed in this project in this regard.

The above times do not include the time needed to input SICL scores for conversion to dimension scores and for the calculation of the client and job match indices. The times also do not include the time needed to input JOCL scores. These input processing and generations of output times are a function of the method of processing utilized. Ultrasystems did not obtain data regarding the input times associated with the use of the teletype input/output system utilized in New Jersey. The procedures utilized in the SER experiment require approximately 10 minutes for the transcription of the SICL data onto the input form and approximately 12 minutes for the keypunch of same. The calculation of the JOCL dimension scores from the completed booklet and card sort requires approximately five minutes. Keypunch time is dependent on the amount of other job order data included. In the SER experiment, the job order form including the CJMS scores required about six minutes for keypunch.

In Ultrasystems' opinion, the time requirements associated with the use of the CJMS in a manpower operation are significant. The time spent by the client is an imposition on the client. The degree to which people taking SICLs need to be supervised affects the direct costs associated with the system. Ultrasystems does not believe administration of SICLs needs to consume the full time of the administrator while they are being completed. Therefore, the administrator could be doing some other clerical-type tasks during the SICL completion process, but should be physically with the people taking the booklets.

The time required to complete JOCLs imposes a different operational problem in that it requires that at least one job supervisor give up one hour of paid time. In other words, part of the cost is borne by the employer. The average time required to complete one JOCL is much greater than the one hour needed to complete the booklet. Obviously, arrangements must be made with the employer and the administrator must travel to the worksite. In addition, there are high incidences of interruptions when completing JOCLs and of the need to reschedule appointments because of work requirements.

Administrating SICLs in groups requires that the group be assembled at one time. This may impose further time requirements on the people. Assuming that one full-time SICL administrator costs $30.00 per day (salary, fringe benefits, overhead), and that it takes one and a half hours per person to complete two SICLs (15 pages each), and that the SICLs are administered in groups of five, then in one seven-and-a-half-hour day 25 SICLs can be administered at a direct labor cost of $1.20 per SICL. Inputting 25 SICLs at 12 minutes per SICL (with the labor cost of a keypunch or teletype operator figured at $45.00 per seven-and-a-half-hour day) would cost another $1.20 per SICL. If one estimates that it requires four hours per completed JOCL (includes time to arrange for the interview and to travel to and from the worksite) at a cost of $50.00 per day (for the job developer), then it would cost $25.00 per JOCL.

The above costs are all estimates. In addition, these costs do not include the computer processing associated with the CJMS, the cost of materials, travel, and the physical plant requirements. They also do not include the costs associated with determining employers to be contacted and deciding on the jobs to be profiled. In addition, no time or costs associated with the resolution of job profile differences between two or more supervisor-completed profiles of the same jobs have been estimated. Furthermore, the time and cost estimates do not include the time and cost associated with selecting clients to whom the SICLs will be administered.

In conclusion, Ultrasystems finds that the time and costs associated with the use of the CJMS are an important consideration to be carefully analyzed when setting up procedures for its use. It is Ultrasystems' opinion that the costs are not prohibitive. One should note that not only are the costs just estimates but that no cost benefits or comparative cost benefits have been determined. Ultrasystems believes that validation studies associated with the use of shorter SICLs should be undertaken. The use of shorter SICLs will not only reduce the direct costs per SICL but will, more importantly, impose less time requirements on the agency clients.

2.3.2 Self-completion Aspects of the Cleff Interview Checklists

The issue of self-completions of the checklists is one of the most important aspects of the use of the CJMS that, in Ultrasystems' opinion, needs to be resolved. It affects not only the costs involved (due to its effect on the requirement for supervision and guidance) but is critical in determining the procedures to be utilized and the skill level required of the instrument administrators, and will, to some currently unknown degree, affect the resultant validity of the system's scores.

The problem in self-completion is due to the difference between the literal interpretation of the activity phrases contained in the checklists and the association between the activity as described and the same activity expressed in a different context, i.e., with a different noun and even a different verb. The problem surfaces on a given page where the respondent cannot find enough phrases for selection. The problem occurs more frequently with the Experience (Done and Not Done) SICL.

In addition to the issue of self-completion, Ultrasystems believes that the following aspects of SICL administration need to be more clearly defined (and substantiated):

1) The reading ability required to complete the SICLs.

2) The relationships between the phrases as currently given and the cultural backgrounds of the people. In this regard, the instruments need to consider differences in dialect in a given language, i.e., Spanish as used in Mexico, Puerto Rico, Cuba, etc.

3) The determination of the usefulness (or validity) of the Experience profile based on the work history of the respondent. Ultrasystems has never seen a clear statement regarding the decision criteria to be applied in the selection of respondents who should not complete the Experience SICL.

2.3.3 Use of the Cleff Cluster Register

The Cleff Cluster Register contains 19 cluster profiles obtained from the mathematical analysis of somewhere on the order of 525 to 750 individual job profiles (see Section 5 of Vol. II). These cluster profiles provide measures of client-job matches in the absence of or in addition to matches to individual job profiles obtained via the JOCL. Ultrasystems did not undertake an analysis of the effect that client-cluster match scores would have on the relationship between retention and the values of the job match and job difference indices that would apply based on the use of the cluster that best matched the profile obtained for the job obtained by the person.

The Cleff Cluster Register states that the individual jobs were collected and then sorted into the clusters such that the correlation between the specific job profile and the cluster profile would be on the average +.90 and not less than +.80. The 110 job profiles obtained by Ultrasystems and used in the retention analysis had a mean cluster correlation of +.81 with 31 having cluster correlations less than +.80 (see Section 5 of Vol. II). The range was from +.51 to +.96. We examined the profiles obtained and found that there was homogeneity between the six Ultrasystems' employees who administered the JOCLs and between the time when they were done in terms of those profiles whose cluster correlations were less than or greater than or equal to +.80. Whereas we did not examine the profiles whose cluster correlations were above or below +.8 in terms of the types of jobs and/or companies involved and whereas we cannot be certain that these profiles were all correctly administered, we do believe that the job profile/cluster correlations obtained indicate that the number of profiles and the types of jobs profiled used to obtain the number of and shape of the cluster profiles in the register is not sufficient. In other words, it is Ultrasystems' opinion that more profiles are needed before cluster shapes can be determined that are benchmarks representing the profiles associated with the spectrum of low- and semi-skilled jobs.

In addition, it is again Ultrasystems' opinion that the following aspects of the use of the Cluster Register needs to be more clearly defined (and substantiated):

1) The mechanism by which one can determine from a non-JOCL job description the appropriate cluster needs to be defined and validated. In other words, if the CJMS is to be used wherein it is not mandatory that every client-job match be measured using the job profile obtained via the JOCL, then definitive instructions are needed for obtaining verbal job descriptions and for determining the appropriate cluster.

2) In the same vein as _1_ above, definitive instructions regarding the types of jobs to be solicited from employers based on client-cluster matches are needed. In other words, one needs instructions for assigning clusters from verbal job descriptions and for determining from the clusters the types of jobs that would, if profiled, have the highest correlation with the given cluster.

3) Ultrasystems believes that analysis of the relationships between Cleff job (and client) profiles and the Dictionary of Occupational Titles 6-digit job codes and associated Worker Trait Group profiles should be undertaken.

2.3.4 Interpretation of the CJMS Client and Job Profiles and Match Indices

Ultrasystems believes that the material it has seen regarding the interpretation of the system scores is inadequate. Ultrasystems further believes that such material should be developed and substantiated for use in the following different applications:

- Job matching as done by manpower agencies involved in client-job referral activities
- Selection of training programs for referral of people as done by manpower agencies
- Counseling of people regarding career choice
- Screening of job applicants as done by employers
- Selection of jobs for which job orders are to be solicited from employers by manpower agencies

The issues that need to be discussed include the following:

- Rigidity of indices cutoff scores
- Interpretation of profile dimension scores in conjunction with and independently of the indices scores
- Interpretation of the indices scores in conjunction with each other
- Interpretation of combined, preference, or experience scores in conjunction and independently
- Use of cluster match scores

Ultrasystems hastens to point out that we strongly believe that there are more factors to be considered in the execution of the applications listed above than are provided by the Cleff system. This is not a criticism of the Cleff system nor should it be so criticized. The list of issues regarding the interpretation of Cleff system scores should not be construed to imply that these are the only factors associated with person-job or person-training matching. There are obviously other factors to be considered.

The U.S. Department of Labor has previously criticized the CJMS because it does not include other factors (or measures) associated with person-job matching. Ultrasystems considers this an unfair criticism, if it meant to imply that because it (the CJMS) does not contain these other measures, then the measures it does provide are either invalid, not needed, or already adequately measured. In other words, to criticize the system for what it does not purport to measure is to ignore what it is meant to do. The system can only be and should only be judged on the validity of the measures provided from which the appropriateness of people-job matches can be inferred.

2.3.5 Other Operational Aspects Associated With the Use of the CJMS

The preceding discussion has touched upon operational aspects of the CJMS associated with instrument administration, score interpretation, client selection, use of the Cluster Register, and self-completion. The following brief descriptions are associated with other aspects of CJMS usage:

1) Capture of Data for Use in Analysis of the CJMS

Ultrasystems considers it of paramount importance that the data necessary for further analysis of the CJMS's validity and usefulness be obtained and anlyzed whenever and whereever the system is utilized. Ultrasystems believes this should be done regardless of whether or not the system is being used in an experimental or operational manner.

2) Inclusion of Other "Search" Variables

Ultrasystems believes that the system would be more useful if it were combined directly with other search or match algorithms rather than be operated independently. Exactly what these other measures are, or more exactly, how one uses them to determine appropriate matches, is beyond the scope of this project.

3) CJMS Computer Program Improvements

In addition to the inclusion of other search measures and algorithms, Ultrasystems believes the usefulness of the CJMS would be improved if the computer program used in its operation included the multidirectional search capabilities that have been developed. In other words, Ultrasystems believes it would be cost effective to include the CJMS algorithms within the structure of an already developed person-job matching program which possesses the capability of searching client files given a job order and vice versa, i.e., given a client search the job files. Ultrasystems believes it is a serious mistake to create an entire computer program around a given set of search algorithms. The technology exists for the development of person-job matching computer software capable of executing one or more search algorithms and of incorporating at the user's discretion additional search methodologies. In addition, the technology exists whereby the computer capability can be modularized for use with different types of input-output procedures, i.e., on-line, remote batch, or conventional batch processing.

2.3.6 Some Comments on the Possible Impact of the Use of the CJMS on Manpower Operations

The discussion to follow, and in fact the discussions preceding this one, is based in a sense on the validity of the CJMS as a partial predictor of the appropriateness of people-job matches. The conclusion reached by Ultrasystems regarding the predictive ability of the CJMS was based solely on the data obtained in the SER experiment. Ultrasystems is fully aware of the limitations that must be placed on the conclusion reached given the data that was utilized. If the system does not provide valid measures from which one can, with a given and acceptable degree of confidence, infer the appropriateness of people-job matches, then obviously any other issues associated with its use are immaterial. Since the conclusion Ultrasystems reached was that the data obtained and analyzed showed validity, we have included the previous discussions and will proceed with this one.

The data obtained from the SER experiment showed that the CAI was the measure most indicative of the long-term retention potential of the person. Since this measure is not controllable by the choice of jobs, from among alternatives, it implies that the matching process is, at least partially, constrained not by the job but by the person. The data obtained from the SER experiment did, however, show that the JMI is predictive of the short-term retention of the job-person match. Thus, the data showed that one would choose from among alternative jobs the one with the highest value of the JMI independent of the CAI (with all other factors assumed to be equal). It thus appears to Ultrasystems that the higher the CAI is the more latitude one would have in choosing possible jobs based on the JMI and, conversely, the lower the CAI the more care should be taken in the job selection process. The ability of a given manpower program to control the match process in terms of the level of the JMI is going to be constrained by the jobs that are available to it. The New Jersey Cleff experiment had a cutoff criteria, based on the CJMS indices, to govern the referral process. These criteria were that for a referral to be made the CAI had to be greater than or equal to +.25 and the JMI had to be greater than or equal to +.50. Using these criteria, one sees that one is immediately constrained in those cases where the CAI is less than +.25 no matter what jobs are available. The use of such a CAI cutoff criterion is thus a very serious issue.

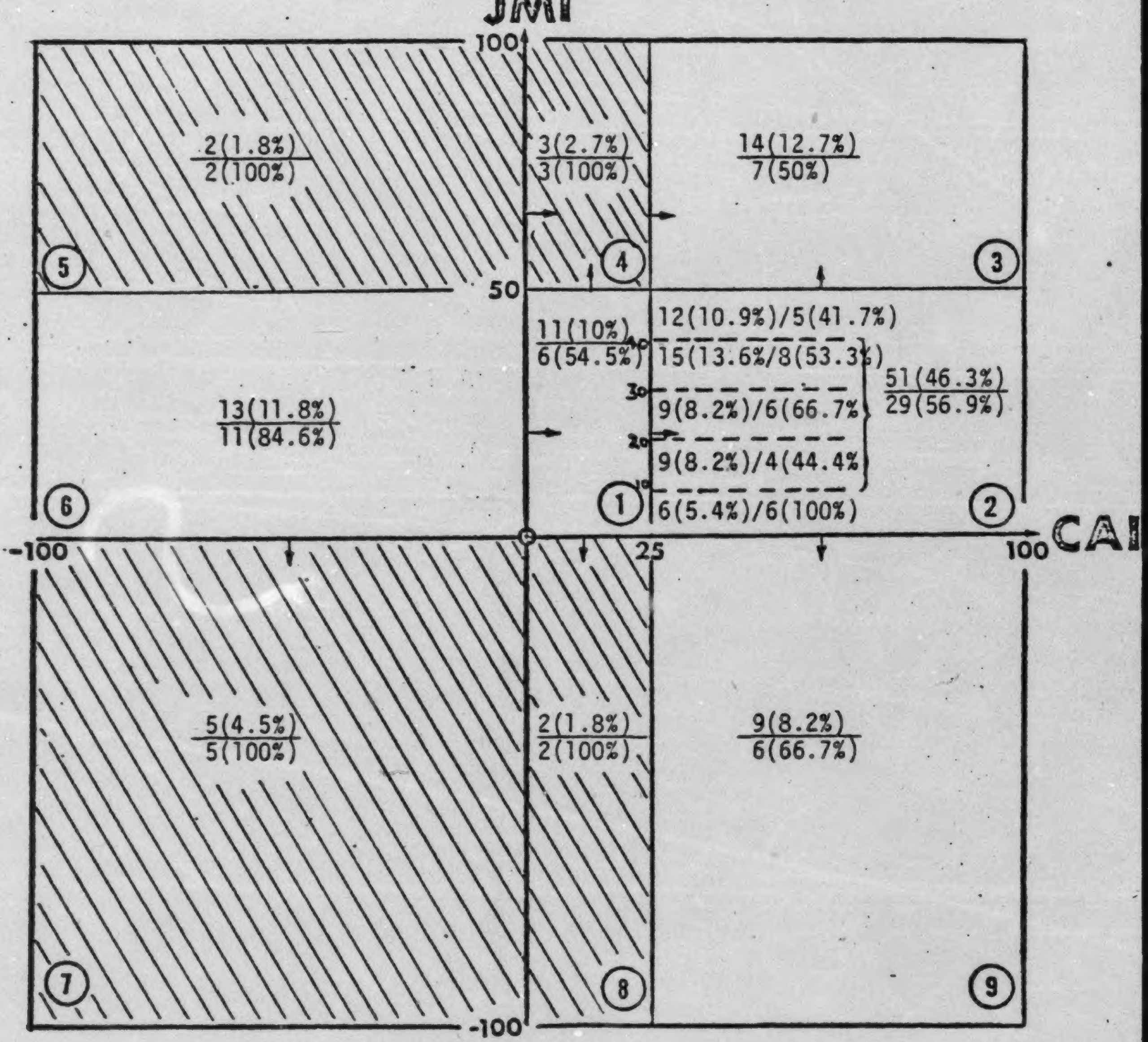
In addition, if only the Preference book is completed, then one has no value for the CAI. What one does in these cases we do not know.

Figure 2-1 shows the distribution, for that part of the SER experimental data base who took both SICLs (110 cases out of 142) of the paired values of the CAI and the JMI. The spectrum of paired values has been divided into nine cells. The arrows indicate the cells in which entries that fall on the cell boundaries were placed (see Section 5 of Part II for the complete definition of the cell boundaries). This figure shows the number of observations in each cell, the percent of the total observations, the number that terminated prior to December 10, 1974, and the percent of each cell who terminated. The figure shows that only 14 placements out of the 110 observations (12.7%) would have met the criteria given above. In addition, the figure shows that 74 people out of the 110 (67.3%) would have met the minimum CAI criterion independent of job match score. Of the total 142 person-job matches, there were 30 (21.1%) which would have met the minimum JMI index score independent of the CAI. One must be very careful in interpreting this data because it does not imply that had the criteria given above been used (or any other cutoff criteria by which at least one case would have been excluded) that some of these people would not have been placed. In addition, it is not definitively known how representative these cases are of SER clients nor is it known at all how representative they are of any other population. The same is true for the job profiles.

The figure does show that had the criteria been applied to these cases then 32.7% would not have been eligible for referral because of their CAI, and of those 74 people eligible for referral based on their CAI, that 60, or 81%, would not have been eligible for the job they were in fact referred to and placed into.

Figure 2-1. Distribution of Paired Observations: Client Adjustment Index (CAI) and Job Match Index (JMI)

- Total of 110 Observations
- As of December 10, 1974, 71 Had Terminated (64.5%)
- Numbers Above Line in Each Cell Are the Number of Observations and the Percent of Total Observations
- Numbers Below Line in Each Cell Are the Number of Terminations and Percent of Cell That Terminated


JMI
100
2(1.8%)
2(100%)
3(2.7%)
3(100%)
14(12.7%)
7(50%)
5
4
3
50
11(10%)
6(54.5%)
12(10.9%)/5(41.7%)
40
15(13.6%/8(53.3%)
30
9(8.2%)/6(66.7%
20
9(8.2%)/4(44.4%
10
6(5.4%)/6(100%)
51(46.3%)
29(56.9%)
13(11.8%)
11(84.6%)
6
1
2
-100
0
25
100
CA
5(4.5%)
5(100%)
2(1.8%)
2(100%)
9(8.2%)
6(66.7%)
7
8
9
-100

The data shown cannot be used to estimate the percentage of clients for whom, at a given time and with all other factors equal, the use of a cutoff criterion based on CJMS indices would have precluded a referral from being made.

The discussion does point out, however, that the use of cutoff criteria could have a significant effect and will have at least some effect on the ability of the manpower organization to refer and place people. Obviously, this is what the system is all about; i.e., it is supposed to provide measures that affect the job matches made. However, it is important to bear in mind that the system with cutoff criteria is going to have differential effects among manpower programs based on the clients who use this organization and the jobs available to this organization. Obviously, the relationships between clients who come to a given manpower organization and the jobs available to it influence the performance of this organization independently of the CJMS. In fact, if the CJMS does indeed provide valid measures, then it is useful in that it can in a quantitative sense direct the organization's activities, at least as regards solicitation of jobs best suited to its clientele. Therefore, it is, in Ultrasystems' opinion, crucial that the use of the CJMS not be restricted in the conventional sense of person-job matching, but that it be used in conjunction with the process of job solicitation. Stated another way, the level and process of job solicitation and the types of jobs usually available are going, in our opinion, to have a significant effect on the usefulness of the CJMS within a given manpower organization.

One should also not lose sight of the following:

1) The system was developed based on data obtained from a certain class of individuals, i.e., those who were employed in low- or semi-skilled jobs.

2) The predictive criterion-related validation done using the data obtained from the SER experiment cannot be used to conclude validity on criterion measures other than retention or for populations of jobs and people not representative of those included in the data base.

2.4 EVALUATION AND EXPERIMENTATION OF THE CLEFF SYSTEM IN OPERATIONAL ENVIRONMENTS

This section will discuss some factors that Ultrasystems believes are important in constructing evaluation designs for use with the CJMS as well as with other approaches to man-job matching.

It is Ultrasystems' opinion that doing a comparative evaluation of the CJMS is much more complex than doing some form of validation analysis. As stated earlier, Ultrasystems believes that it is of paramount importance that data be assembled for use in evaluation and validation whenever and wherever the CJMS is being used.

The formulation of a comparative evaluation design for use with the CJMS should, in Ultrasystems' opinion, consider the following issues:

1) The comparative evaluation should include, in the design, comparison of both placement and post-placement performance. The measures postulated for the New Jersey Cleff experiment are, in our opinion, a good starting point.

   Without trying to presuppose the results of such an evaluation, Ultrasystems believes there is a good possibility that improvements in placement performance measures may not be possible to achieve, in the short term, in conjunction with improvements in post-placement performance. Obviously, the determination of the interaction between these two objectives is one of the major purposes of doing such a comparative evaluation. The rationale behind this belief is based on the following assumptions:

   a) that improving the person-job match (selection) process is one of the keys to improving the post-placement measures

   b) that the comparative evaluation is conducted so that the alternative person-job matching methodology is the only process that is changed and thus differentiates the two groups

   c) that the use of an alternative matching strategy which will improve post-placement performance is going to be accompanied directly by a narrowing of the range of alternative matches that can be made

d) that narrowing the range of matches is going to adversely affect placement performance when no other changes are made, i.e., when no changes are made in the organizational processes to increase the number and types of jobs available, the number and types of clients, and the exposure provided each to each other.

Ultrasystems is aware of the view that improving the quality of the person-job match can be considered as a way of increasing the use made of the referral organization by employers and people. That this could occur is true; however, Ultrasystems believes this takes some time to establish. This was the meaning of the phrase "in the short term." If, in fact, the match strategy narrows the alternatives, then one may be further constrained by the alternatives currently available before the impact of improved quality of matches can be brought to bear. One is in sort of a chicken-and-egg situation in that increased access to jobs and jobseekers may be needed in order for the new match strategy to really be capable of working and that obtaining this increased access may not be possible unless the improved quality of the matches can be demonstrated.

2) If a comparative evaluation is undertaken wherein more than just the matching strategies are changed, then it will be difficult, if not impossible, to establish the causal linkages between all criterion measures utilized and each of the process changes that are made. One should keep in mind that computerized matching systems which attempt to replicate the matching strategies now executed in the minds of the referral intermediaries are predicated on the idea that increasing the number of alternative jobs considered will increase placement performance. Thus, they are predicated on the power of the computer to execute the logic, now done in the minds of the people involved, across a larger number of alternatives in a time period not humanly possible.

Ultrasystems does not believe that, in fact, one can with a computer replicate the process by which human judgment is brought to bear on the referral process. It is our opinion that one is forced to quantify in some way what are not totally quantifiable decisions. In addition, one obtains total repetitiveness in the manner in which the matches are calculated. Ultrasystems does not want to convey the impression that the matching strategies now used by referral interviewers are really defineable. In many ways, what really occurs is somewhat unclear. It also varies considerably across the personnel involved. Computerization will by definition have to standardize the approach. This does not mean that human intervention will not be brought to bear. If human intervention does intervene in the sense of screening the matches chosen by the computerized search logic, then it is constrained by the matches that were chosen prior to the intervention. If the computerized search logic depends on the input of search variable values determined by the referral intermediary, then it is susceptible to differences in the understanding that goes into their selection.

The computer aspects of people-job matching are not the only issues associated with process changes attendant with the use of an alternative match system. Increased job solicitation is another key process change which, if introduced along with a match strategy change, can cloud the causal inferences that can be drawn based on changes in the evaluative measures.

3) The comparative evaluation of placement and post-placement performance has obviously as its objective the measurement of the effects of the use of the alternative matching strategy. The degree that the alternative strategy is actually used is therefore important. One of the objectives of a comparative evaluation should be to obtain a measure of how applicable the alternative strategy really is independent of its validity and independent of other changes in process that are necessary. This is a difficult issue, but it is important with a system such as the CJMS, since the measures provided are not all that should be used in selecting jobs for referral. In other words, it is our opinion that the use of the CJMS measures to totally direct the referral process is not acceptable. The degree to which other factors are analyzed and used to direct the match process conditions the causal link between placement performance changes and the use of the system.

In this regard, then, it is essential that data be obtained which can be used to assess the degree to which the system is used and, in fact, can be used. One way is to analyze the referrals that were made in terms of the systems scores. In order to do this, one will need to know the referrals that were possible for a given client at the points in time when the client was available for referral. Ultrasystems believes that a worthwhile approach would be to implement the administration of SICLs and JOCLs for a period of time in which the resultant scores and profiles would not be made available to the referral personnel. One could then analyze the effect that imposing the use of the system would have on the referrals that could be made and that were made. One will not know what the outcome of any alternative referrals would have been but one could obtain some measure of the degree to which the referrals would have changed. In order to do this, one must be careful that the alternative matches indicated by the system were, in fact, possible. This means that not only must the jobs have been in open status at the time the client was available for referral, but that the alternative matches must also satisfy other criteria not measured by the system being examined.

One can use this approach for any matching algorithm and, in fact, for examining what are the strategies now being used. One can, with this approach, also obtain the data needed to validate the alternative (and current) strategy, in a predictive sense, if the post-placement criterion measures are obtained. In a sense, this is what Ultrasystems did in the SER experiment, except that we did not obtain the data needed to assess what the alternative matches were for a given client when the client was ready to be referred, nor did we obtain the data needed to assess the influence of other factors which also determine the alternatives really available.

In addition, Ultrasystems believes it would be worthwhile to have the referral intermediary document in some manner the matches that were considered and the reasons why ones were rejected and/or chosen for referral. This should be done in both phases of the experiment. It would provide extremely valuable data, but it is not clear to us exactly how one would do this.

4) Ultrasystems believes that the approach discussed above is the preferred way to implement a comparative evaluation. The comparison group should, in our opinion, be assembled prior to the experimental group. The CJMS instruments should be administered to the jobs and people who comprise the comparative group, but the scores should not be provided. The implementation of an evaluation in this manner will provide data for use in several important analyses:

   a) It will provide data which can be used to assess what the difference is between the CJMS preferred (indicated) matches and the ones actually provided under existing processes.

b) It can provide data that can be used to assess the impact of alternative cutoff criteria, especially that which is associated with CAI.

c) It can be utilized to test the use of procedures whereby job descriptions can be obtained which will enable one to assign the appropriate cluster with a given degree of confidence. Ultrasystems believes it may be extremely difficult for a manpower organization to consistently obtain JOCLs in time for their use in matching. In other words, if a large percentage of referrals and placements are made within a few days after receipt of the job order, then it is going to be very difficult, if not impossible, to obtain the corresponding JOCL in a short enough time period so that the time-to-fill performance is not seriously impaired. It is inconceivable that an organization would withhold a job opening because no JOCL was available. Therefore, Ultrasystems believes it is extremely important that a proven methodology be developed which will enable an order taker to assign the appropriate cluster based on a verbal job description.

   Examination of recent performance data can reveal the extent of this issue. Repeated job orders from given employers can be profiled and stored for re-use.

d) The generation of the comparison group prior to the experimental group will also enable one to determine the differential analyses that can be undertaken. In this regard, Ultrasystems believes it is important that one review recent data to assess the length of time that each of the experimental phases should last. One needs to examine the client and job characteristics obtained over varying time periods to determine how long it will take to achieve the desired cell sizes for the evaluation. Hopefully, the currently available data can provide the proper disaggregations so that one can determine the characteristics of the client and jobs that are within the range of applicability of the CJMS. One could also use the CJMS data obtained on the comparative group to assess the impact that cutoff criteria will have on the resultant cell sizes.

5) Obviously, extreme care must be taken to insure, to the degree feasible, comparability between the people and jobs in the two groups. The criteria associated with the use of the CJMS for both people and jobs must be applied to both groups. The examination of recent agency data mentioned

above can be used to determine the percent of agency clients and jobs which will meet the criteria as a function of time.

Examining recent data can reveal the extent to which differential analyses based on client and job characteristics, independently and paired, can be undertaken based on agency volumes over time. In this regard, Ultrasystems believes it would be useful to see if one could assemble a special comparative data base consisting of the same jobs at the same companies to which both client groups would have referrals and placements. This would enable one to compare post-placement performance using the alternative match strategies holding the job-company variable constant. If one could also obtain from these selected companies data on their overall retention in these job categories, one would have another valuable comparative measure.

6) One could ignore much of what has been said above and simply compare performance over given time periods where the system was not used and was used. One could do this without attempting to determine to what extent the system was actually used on the premise that its use could never be totally enforced or, stated another way, that its use will vary depending on the judgment of the referral personnel. In this sense, one would be interested in determining why it was or was not used and might not really have comparative performance data reflecting its use in all situations to the degree it was applicable. If the system is truly valid in the types of situations that are a reasonable percent of the agency's operations, then one could base its use on this validity without regard to its overall effect on placement performance. One might still implement process changes to improve job solicitation activities and to provide computer assisted bidirectional matching to increase exposure based on the contention that this will improve placement performance independent of post-placement performance.

7) The attainment of CJMS profiles during the non-use portion of the experiment provides better data for use in predictive validation studies because of the wider range of indices attainable. If cutoff criteria are used in the use phase, then this will tend to narrow the range of resultant scores for use in predictive validation against post-placement performance criteria. While there are statistical techniques available for dealing with restrictions in range, Ultrasystems believes it is better to use the data obtained in the non-use portion for predictive validation studies.

The selection of instruments to be used to obtain the post-placement performance measures of job performance and satisfaction is also extremely important. The heterogeneous nature of the job and client samples to be utilized will have an effect upon the instruments that are usable. Ultrasystems believes both the people and the supervisors should be interviewed. In addition, one should interview the clients and employers where the referral did not result in a hire to determine the reasons why this occurred for analysis against the matching strategies utilized in the non-use and use portions of the experiment.

3.0 DESCRIPTION OF THE CLEFF JOB MATCHING SYSTEM

This section presents a description of the design and operation of the Cleff Job Matching System. The details regarding the methodology associated with the development of the system, the basic tenets underlying the system, and the history of its development will not be discussed here. The reader is referred to Appendices A and B for this material.

The CJMS is based on obtaining numerical scores from applicants and about jobs for each of sixteen dimensions of work. These sixteen dimensions are divided into three categories: there are 8 dimensions for Thing-oriented activities, 4 for People-oriented activities, and 4 for Idea-oriented activities. Each of the 16 dimensions are defined in Table 3-1. The set of 16 numerical dimensions obtained is referred to as a profile. The same 16 dimensions are used on both the client profile and the job profile.

The numerical scores for each of the 16 dimensions are obtained via what is referred to as a checklist. There are, in fact, two checklists for use by clients and one checklist for use by employers in describing jobs. In addition, there is a Card Sort System utilized in describing jobs. Each card pertains to one of the 16 dimensions. Hence, there are sixteen such cards. The content and administration of these checklists and the job cards will be discussed separately in the following sections. This will then be followed by a discussion of how the system matches or relates the clients' 16-dimension scores to the job scores.

3.1 THE CLIENT SELF-INTERVIEW CHECKLIST (SICL)

As stated previously, the numerical scores for each of the sixteen dimensions for each client are obtained via Self-Interview Checklists. There are two of these checklists for use by each client. The client checklists are referred to as SICL's, which is an acronym for the term "Self-Interview Checklist." The two SICL's are titled Likes and Dislikes and Done and Not Done. They are commonly referred to as the preference SICL and the experience SICL, respectively. The Likes and Dislikes SICL (the preference SICL) is used to obtain, for each dimension, numerical scores that indicate what they, the client, like best and dislike most (what motivates them positively and negatively). The Done and Not Done SICL (the experience SICL) is used to obtain, for each dimension, numerical

TABLE 3-1. DEFINITION OF 16 CLEFF JOB-CLIENT MATCHING SYSTEM PROFILE DIMENSIONS

T -- Thing-oriented Behaviors

Job activities which immediately and directly involve the worker with *things* such that:

T-1 Athletic
- uses the *large muscles* of the body in *hard physical* labor
- pays attention to broad overall results only

T-2 Utility
- helps others by doing unimportant things to save their time and energy
- acts in response to some immediate demand by someone else

T-3 Fine Manual
- uses fingers in close coordination with the eyes
- pays attention to details and small things

T-4 Gross Manual--Independent
- applies *some* skill in the use of hands, tools, or machinery
- is relatively free from detailed supervision by procedure, supervisor, or machinery

T-5 Gross Manual--Dependent
- applies *little* skill in the use of hands, tools, or machinery
- is dependent on detailed and close regulation by procedure, supervisor, machinery, or assembly line

T-6 Order
- puts things where they belong
- cleans or tidies things
- lubricates things

T-7 Correction
- corrects the *quality* in own work or in the work of others
- insures quality performance of machinery and equipment

T-8 Locomotion
- drives or operates mobile vehicles
- operates equipment mounted on vehicles
- physically moves away from work space a good deal

TABLE 3-1 (continued)

P -- People-oriented Behaviors

Job activities which immediately and directly involve the worker with people such that:

P-1 Attendance
- provides a service completely determined by the employer
- has a very narrow range of decision
- has minimal and superficial contact, never physical

P-2 Physical Service
- gives a regularized service which meets their personal needs or demands
- is permitted a relatively wide range of decision within specified duties
- can have physical contact, but a superficial personal relationship

P-3 Management
- guides, influences, or directs the present and/or future ongoing behavior of others
- takes or shares responsibility for results of that behavior, including their work
- there is high potential for emotional relationships

P-4 Persuasive
- convinces and persuades others to react quickly in some way beneficial to employer
- takes little or no responsibility for future behavior of other persons

TABLE 3-1 (continued)

I -- Ideas and Information-oriented Behaviors

Job activities which immediately and directly involve the worker with ideas and symbols such that:

I-1 Verbal
- uses written or spoken words to represent ideas, people, or things
- describes situations and relationships, or solves problems, using words

I-2 Numerical
- uses numbers or number concepts to represent ideas, people, or things
- describes situations and relationships, or solves problems, in numerical terms

I-3 Clerical
- records or orders data of any kind
- processes paperwork intended to do that

I-4 Innovative
- gives a personal interpretation to a situation and finds an artistic, creative, or original solution to it or change in it
- expresses some personal idea nonconventionally

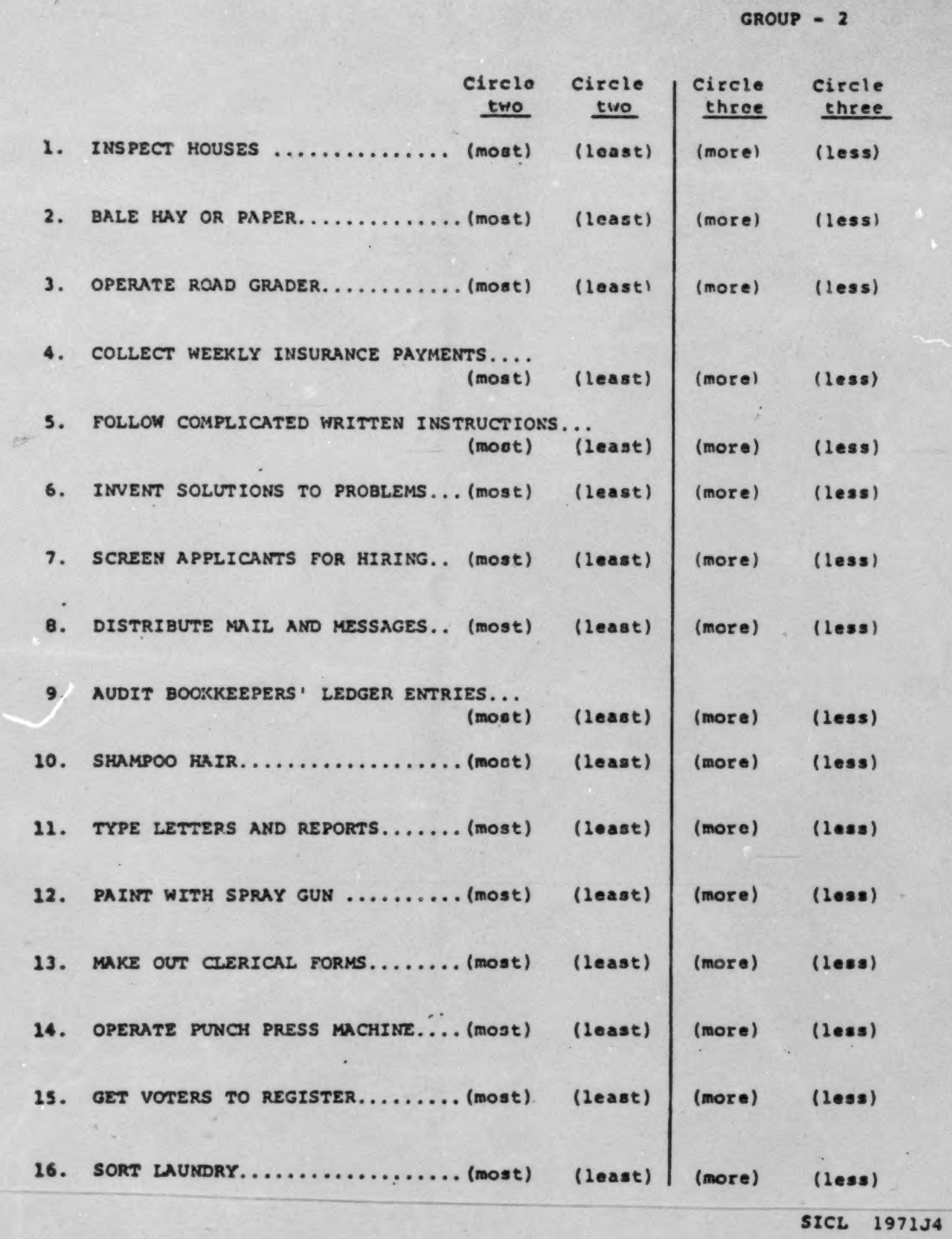
scores that indicate what they, the clients, have done most and done least. Depending on the client's work history, the experience SICL may or may not be utilized. In all cases, the preference SICL is utilized.

Each of the two SICL's consists of fifteen pages with each page containing sixteen activity-oriented phrases or behavioral units. Figure 3-1 shows a page taken from the preference SICL. On each page of each SICL, there is one activity-oriented phrase (or behavioral unit) for each of the sixteen dimensions. The Project Indianapolis report, shown in Appendix B, describes the methodology by which these phrases (and the sixteen dimensions) were developed. As described in that report, each phrase (or behavioral unit) consists of a set of words which describe a unique and meaningful activity and a behavior which has some objective. Each phrase consists of a verb and an object.

After reading all sixteen phrases on a given page, the client then selects ten phrases. The rationale underlying the selection depends on which SICL is being completed. For example, with the preference SICL, the client selects from each page the two phrases which describe activities the client likes the very most and the two which describe activities the client likes the very least (or even hates). The client then goes through the remaining 12 phrases and selects the three which the client likes more than any of those remaining, and then selects the three which the client likes less than any of those remaining. The client does this on each of the fifteen pages. The rationale underlying the experience SICL is the same except the term "likes" is replaced by the term "done." The instructions state that the client is to consider, in making the selections, those activities that the client has done and not done during the course of his/her lifetime up to the time that the checklist is being completed. The instructions further state that this is to include activities associated with not only jobs that the client may have had, but also with those activities done "in school, play, at home--as a matter of fact, at any time." Appendix E contains the full set of instructions for administering the SICL's.

3.2 THE JOB OUTLINE CHECKLIST (JOCL) AND THE JOB CARD SORT

The Job Outline Checklist (JOCL) is similar to the SICL's described above. The JOCL consists of ten pages with each page again containing sixteen activity-oriented phrases or behavioral units. Figure 3-2 shows one page from the JOCL. There are, in fact, two JOCL's, one for use with white-collar jobs and the other for use with blue-collar jobs. The difference between these two is in the wording of the phrases. Not all the phrases are worded differently.

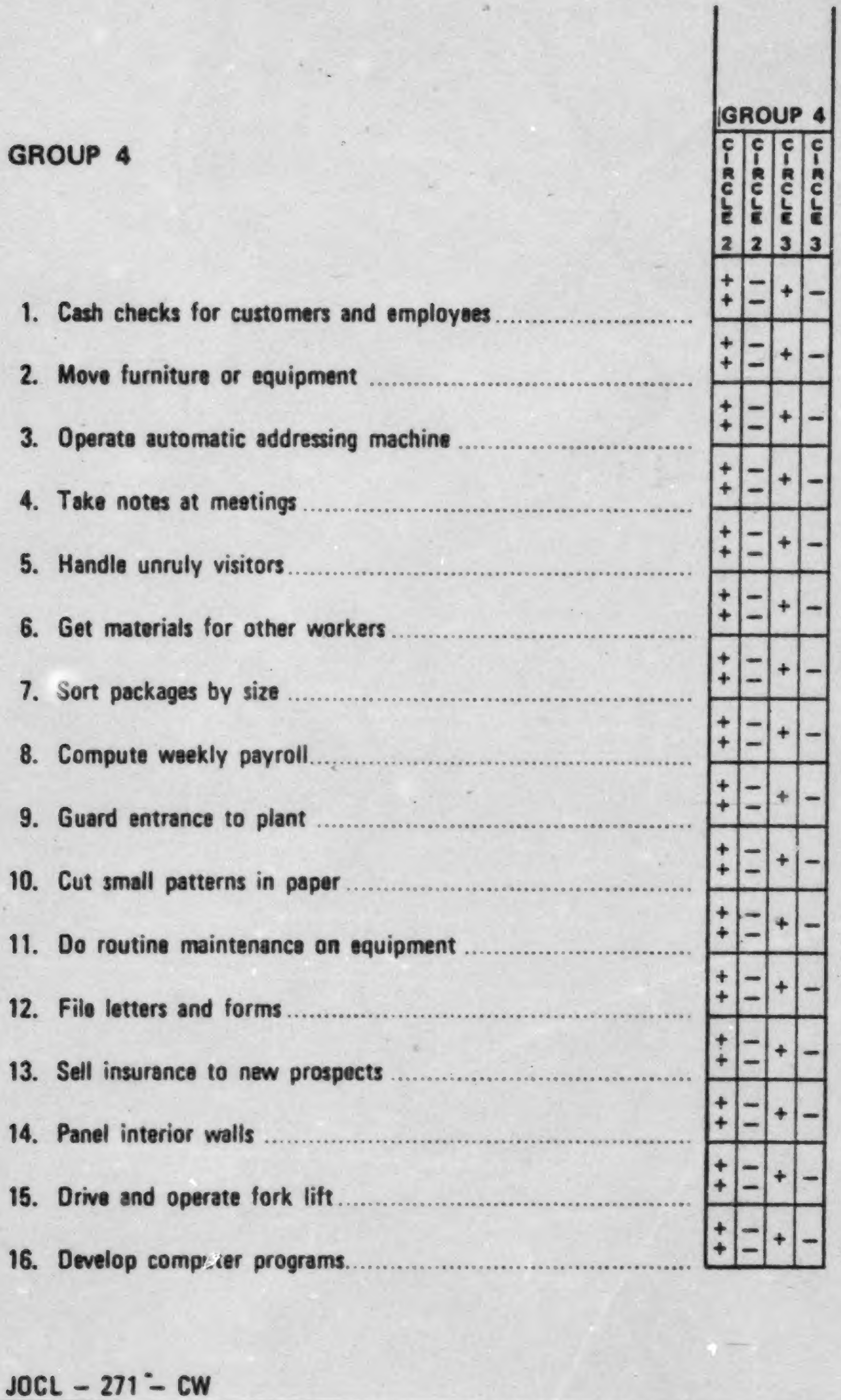


GROUP - 2

	Circle two	Circle two	Circle three	Circle three
1. INSPECT HOUSES	(most)	(least)	(more)	(less)
2. BALE HAY OR PAPER..............	(most)	(least)	(more)	(less)
3. OPERATE ROAD GRADER............	(most)	(least)	(more)	(less)
4. COLLECT WEEKLY INSURANCE PAYMENTS....	(most)	(least)	(more)	(less)
5. FOLLOW COMPLICATED WRITTEN INSTRUCTIONS...	(most)	(least)	(more)	(less)
6. INVENT SOLUTIONS TO PROBLEMS...	(most)	(least)	(more)	(less)
7. SCREEN APPLICANTS FOR HIRING..	(most)	(least)	(more)	(less)
8. DISTRIBUTE MAIL AND MESSAGES..	(most)	(least)	(more)	(less)
9. AUDIT BOOKKEEPERS' LEDGER ENTRIES...	(most)	(least)	(more)	(less)
10. SHAMPOO HAIR..................	(most)	(least)	(more)	(less)
11. TYPE LETTERS AND REPORTS.......	(most)	(least)	(more)	(less)
12. PAINT WITH SPRAY GUN	(most)	(least)	(more)	(less)
13. MAKE OUT CLERICAL FORMS........	(most)	(least)	(more)	(less)
14. OPERATE PUNCH PRESS MACHINE....	(most)	(least)	(more)	(less)
15. GET VOTERS TO REGISTER.........	(most)	(least)	(more)	(less)
16. SORT LAUNDRY...................	(most)	(least)	(more)	(less)

SICL 1971J4

Figure 3-1. Sample of Page Taken From Preference SICL



GROUP 4

	GROUP 4			
	CIRCLE 2	CIRCLE 2	CIRCLE 3	CIRCLE 3
1. Cash checks for customers and employees	+ +	– –	+	–
2. Move furniture or equipment	+ +	– –	+	–
3. Operate automatic addressing machine	+ +	– –	+	–
4. Take notes at meetings	+ +	– –	+	–
5. Handle unruly visitors	+ +	– –	+	–
6. Get materials for other workers	+ +	– –	+	–
7. Sort packages by size	+ +	– –	+	–
8. Compute weekly payroll	+ +	– –	+	–
9. Guard entrance to plant	+ +	– –	+	–
10. Cut small patterns in paper	+ +	– –	+	–
11. Do routine maintenance on equipment	+ +	– –	+	–
12. File letters and forms	+ +	– –	+	–
13. Sell insurance to new prospects	+ +	– –	+	–
14. Panel interior walls	+ +	– –	+	–
15. Drive and operate fork lift	+ +	– –	+	–
16. Develop computer programs	+ +	– –	+	–

JOCL – 271 – CW

Figure 3-2. Sample of Page from JOCL

The JOCL is to be completed by the job supervisor, or preferably by more than one supervisor, at a given employer, who each supervise employees working at jobs to be profiled. The mechanics of completing the JOCL are the same as for the SICL, i.e., on each page (each page is referred to as a group) ten phrases are to be selected. The instructions for the selection of the phrases are as follows (the quotations are from the instructions printed in each JOCL):

1. *Try to visualize the ideal worker doing the job you are describing.*
2. *Carefully read all sixteen activity-phrases in each group.*
3. *Decide which two activities most resemble the behaviors most required by this job in order to do it best.*
4. *Decide which two activities most resemble the behaviors least required (or most interfering) in this job.*
5. *Of the remaining 12 activity-phrases, pick the three which are most like what should be done on this job to do it right.*
6. *Of the remaining 9 activity-phrases, pick the three which are most like what is not required (or interferes) in the job.*

The instructions in the JOCL also state:

> *Work quickly, don't take too much time mulling over any one phrase or group of phrases, your first considered impression is what is desired here.*
>
> *It helps to imagine that the sixteen activities in a group are all that are available to do the job you are describing, and you must pick the best and the worst for the job.*

After the job supervisor(s) has completed each of the ten pages (groups) in the JOCL according to the above rules, the supervisor is then asked to sort a deck of sixteen cards. There is one card for each of the sixteen dimensions of work. The front of each card contains a definition of one of the dimensions. The definitions are essentially the same definitions as given in Table 3-1. The back of each card contains examples of the activities that each dimension refers to. As an example, on the back of the T-1 Athletic dimension card, the following examples are given:

> *Examples: load trucks, carry heavy things, carry large baskets of files, push loaded carts, move furniture or equipment*

As with the JOCL booklet, there are two sets of these cards, one for use with white-collar jobs and the other for use with blue-collar jobs. The above example is from the white-collar set. The examples for T-1 Athletic, from the blue-collar set, are:

> *Examples: dig ditches, shovel coal, load trucks*

The job supervisor is asked to sort the deck of 16 cards according to the following rules (taken verbatim from the instructions in the JOCL):

> *Sorting the card deck*
>
> 1. *Each card has a definition of a particular kind of work behavior on one side (in black) and examples of this kind of behavior on the back (in red).*
> 2. *Read all sixteen definitions very carefully.*
> 3. *Pick the five definitions which best describe what must be done on this job in order to do it right. Put them in a pile to the left.*
> 4. *Pick the five definitions which best describe what must be* avoided *by a worker in this job; or at least required by the job. Put these five cards in a pile to the right.*
> 5. *Go through each pile of cards to review what you have done. Rearrange if necessary.*
> 6. *Put the six cards not picked back in the envelope.*
> 7. *Record your choices on the facing page and follow the instructions.*
> 8. *Return all cards to the envelope.*

Instruction 7 refers to the page in the JOCL booklet where the job supervisor lists the names of the five dimensions of work which were chosen that best describe what must be done on the job to do it right and the five dimensions which best describe what must be avoided by a worker in this job, or are least required by the job. (See instructions 3, 4, and 5 above.) The job supervisor then assigns a scale value to each of these dimensions. For those five that are the best descriptions of worker activities required for doing the job as well as possible, the five scale values are defined as: *Outstanding, Very Great, Great, A Lot, Some.*

For the other five dimensions (least necessary to the successful doing of the job), the five scale values are defined as: *Highly Interfering, Interfering, Unnecessary, Very Seldom Required, Unlikely.*

This completes the job outline portion of the Cleff Job Matching System. Appendix E contains the full set of instructions for administering the JOCL, except for those which pertain to arriving at the numerical scores.

3.3 ADMINISTRATION OF THE SICL AND JOCL

The preceding two sections have described the content of the SICL and JOCL instruments and the mechanics of their completion. This section will discuss the administration of the checklists. One aspect of the administration of both checklists is straightforward and deals with explaining the mechanics of completion. The instructions given in Appendix E and the preceding discussion essentially cover this aspect. However, there is more to the administration of both checklists than just explaining the mechanics and then having the client or the job supervisor complete the checklists by themselves according to the instructions. Essentially, however, the checklists are completed by the client or the supervisor on their own.

Some of the other aspects of administration are, in Ultrasystems' opinion, not very clearly defined. The sections which follow will discuss these aspects of administration in terms of what Ultrasystems has observed and has been told. The reader should note that Ultrasystems was trained by personnel of ADP-PDS, Inc. in the administration of the checklists, observed checklists being administered, and discussed their administration with the staffs of the agencies involved in the New Jersey/Cleff experiment.

3.3.1 Administration of the SICL

One of the steps involved in SICL administration has to do with determining the reading ability of the person who is going to complete the checklist. The instructions prepared by the system's developers state:

> *There are two ways of collecting experience and preference data using the SICL. The first, and most desirable method, (standard), is to have the clients describe their preferences and experiences by completing the SICL themselves.*
>
> *The second method, which is known as the "Direct Rating Format (DRF) of the SICL," should only be used in those cases where it is not possible to use the first method, e.g., the client is illiterate, the client cannot read at the 6th-grade level or above, etc.*
>
> *If the "reading level" of the client is unknown, it is first necessary to determine if he or she will comprehend the words and phrases used in the SICL. This may be accomplished by having the client read the "reading paragraph" (see attachment 2a) aloud to the counselor; if the client does not make more than four (4) mistakes the SICL may be (self) administered through use of the standard method. If the client makes five (5) or more mistakes with the reading paragraph, the Direct Rating Format of the SICL should be used.*

The reading paragraph referred to above and the instructions for its use are shown in Figure 3-3. There is also a Spanish language version of the SICL.

As discussed earlier, there are the mechanical aspects of administration. In actual practice this includes reviewing the manner in which the client has completed one or more pages of the SICL, as they are completed, to make sure that the instructions are being followed. One should note that on any given page ten activity-phrases are to be selected in the order described earlier. One cannot select the same activity-phrase more than once, and one must select the correct number of phrases in each of the four categories (two most, two least, three more, three less).

The other major area of administration has to do with the client's ability to understand or relate to the activity phrases given on each page of the SICL. The reading paragraph and/or reading level requirements discussed above are designed to insure that the person can read well enough to understand what the phrases mean and can do this in a reasonable length of time. However, there is the possibility that a client may, after reading all the activity phrases on a given page, indicate that he or she cannot find any or enough phrases that he or she likes to do, or has done, or doesn't like to do, or hasn't done.

ATTACHMENT 2 a

PERSONNEL DATA SYSTEMS, INC.
342 MADISON AVENUE
NEW YORK, N.Y. 10017 • (212) 687-1477

READING PARAGRAPH

There are many kinds of people, and many kinds of jobs. Some people operate road graders, paint outside of houses, sell groceries in a store, or repair automobiles. Other people may preach sermons in church, take neighborhood surveys, demonstrate automobile parts for sale, or do research on historical events. And the jobs ask people to do various things; for example, feed children, lay bricks, work with a microscope, interview job candidates, and maybe even do mechanical drawing. There is no telling what a job might demand of a person. We know of a job where the worker was asked to supervise cleaning a building, read complicated instructions, read gauges on machinery, measure food ingredients, and catalogue mail order merchandise. He found the job interesting because he was asked to do so many different things.

Figure 3-3. Reading Paragraph and Instructions For Its Use.

PERSONNEL DATA SYSTEMS, INC.
342 MADISON AVENUE
NEW YORK, N.Y. 10017 • (212) 687-1477

CLEFF MATCHING SYSTEM

Instructions to Counselor - Interviewer

Ask the candidate to read the READING PARAGRAPH.

Say, "We in this office are writing a brochure for our customers, the job applicants like you, and we want to make sure that we are using words and language which makes sense to you. We would like you to read it aloud, then tell us if you think we can make it better, and how to do that." Or words to that effect.

Permit the applicant to read it aloud without interference, but help if he has trouble, in a sympathetic way of course, to get him through.

Keep note of the number of words he cannot accurately read. Mispronouncing a word does not necessarily mean he cannot read it. Use your own judgment.

If you are sure he cannot read five or more words in the paragraph, then do not refer him for the standard S.I.C.L. Instead, you may want to consider administering the Direct Rating Format of the S.I.C.L. to him orally.

If you administer either the Standard or the Direct Rating Format of the S.I.C.L., introduce the applicant to the system - tell him about increasing the potential for a good job match.

Figure 3-3. (continued)

In other words, it can and does occur that the person reading the phrases literally, cannot find enough phrases that they can select according to the rules governing their completion. The manner in which this type of situation is to be dealt with is not discussed in the instructions as given in Appendix E. The published article shown in Appendix A states *"applicants, unsupervised, go through the form twice in about an hour."* The term "unsupervised" does not mean that they are simply given the checklists to complete entirely on their own. The mechanics of the completion are explained and checked. The term means that the selection of the activity-phrases is to be done entirely by the applicant. Thus, when an applicant indicates that he or she is having difficulty in finding enough phrases to select, according to the rules, one is faced with a decision as to whether or not to assist the applicant. Obviously, this is a serious issue. Ultrasystems' exposure to the Cleff System has shown us that, in fact, administrators of the SICL's do talk to the applicants when this type of situation arises. Basically, what they do is to try and get the applicant to "relate" to the "literal activity-phrase." In other words, they try and get the applicant to "associate with the activity-phrase" in terms of activities that are similar in content to the activity described in the phrase as printed. Our exposure has also shown that this occurs much more often with the experience SICL than with the preference SICL.

There is another aspect of administration that is closely related to the point just discussed. This has to do with the knowledge that the SICL administrator has about each applicant prior to the applicant's completion of the SICL. Obviously, if one is to be able to determine the applicant's reading ability prior to start of the taking of the SICL, one is going to have to know something about the applicant, i.e., ability to read. Ultrasystems has also observed that because of the situation discussed above (clients having difficulty in selecting enough phrases based on the literal content of the phrase) users of the system sometimes interview each client prior to the SICL's administration so that they feel they can better help the client to relate to, interpret, or associate with the literal phrases.

There is one other aspect of the SICL administration that deserves to be mentioned. This concerns the decision that can be made as to whether or not the client is to be given the experience SICL. The rules governing this are not, to our knowledge, definitively defined. Our exposure has shown that this is a judgmental decision that is made based on the client's work history. For example, in actual practice, clients who are recent high school graduates and who have no work experience, may not be given the experience SICL. If they are given the experience SICL, the results obtained may not be used to the same degree as those obtained from the preference SICL.

3.3.2 Administering the JOCL

The administration of the JOCL is very similar to the SICL. Aside from the mechanics, the similarity includes the other issues just discussed. Ultrasystems' exposure to the system has shown that job supervisors also can have difficulties in completing the JOCL because of the literal meaning of the activity-phrases. Again, one is confronted with the situation where the person completing the checklist indicates that they cannot select the proper number of activity-phrases on a given page. The situation is usually associated with the choosing of:

1) the two phrases that most resemble the behaviors most required by this job in order to do it best, and
2) the three phrases selected after the first four are selected (the two most and the two least) which are most like what should be done on the job to do it right.

Again, the situation has to do with the literal meaning. The instructions utilize the phrases "most resemble" and "most like" which indicate that the literal meaning is not what determines the selection. In other words, the instructions do indicate that the job supervisor is to associate or interpret the literal activity-phrase with activities associated with the job in the sense that the activity-phrase resembles or is like these activities. The situation arises, however, where the job supervisor asks for help or asks for an example of how this is to be done. In practice, it is common (or even required) for the administrator to discuss the job in general terms with the job supervisor, prior to the supervisor's completion of the JOCL. It is also common to have the job supervisor show the JOCL administrator employees who are currently doing the job. In this way, the JOCL administrator obtains a "feeling" or an "understanding" of the activities associated with the job. This "feeling" or "understanding" of the job is usually transformed in the

JOCL administrator's mind into a view of the job activities in terms of the sixteen dimensions of work. If the administrator knows (and the administrator should) the relationship between each activity-phrase and each dimension, it enables the administrator to describe, in terms specific to the job being profiled, the resemblance between a literal phrase and the activities of the job. Thus the job supervisor gets a "feel" or an "understanding" of what the terms "resemble" or "most like" mean. When one is explaining the mechanics of the JOCL completion, one clearly indicates the terms "resemble" and "most like." One does this not with examples, but in terms of what the words resemble or most like mean. When a job supervisor indicates that he or she can't select enough phrases on a given page, one repeats the instructions using the terms "resemble" or "most like." However, sometimes this is not enough and the administrator is faced with the decision of giving an example or of having an incomplete JOCL.

3.4 SCORING AND MATCHING

The Cleff Job Matching System uses the selected activity-phrases and the JOCL Card Sort to generate a set of sixteen numerical scores, i.e., one for each of the sixteen dimensions of work. These dimension scores are obtained by adding together numerical values that are assigned to each of the four categories into which an activity-phrase can be selected. The four categories are: *Most, Least, More, and Less*. Activity-phrases not selected are assigned a value zero. The numerical values are positive and negative and the resultant set of sixteen dimension scores always adds to zero.

The set of sixteen numerical dimension scores is referred to as a profile. Each SICL results in a profile; hence, there is an experience and a preference profile. The JOCL and the Card Sort also result in two profiles. The profile obtained from the ten-page checklist is referred to as the Job Specific Profile. The profile resulting from the Card Sort is referred to as the Job General Profile. These two profiles are added to each other to obtain the job profile.

For each client the experience and preference profiles are related to each other using two statistical measures as follows:

1) the correlation coefficient between the experience and preference profiles is calculated and is referred to in this report as the Client Adjustment Index (CAI). It is also referred to as the Occupational Adjustment Index (OAI)

2) the sum of the squared differences over the sixteen dimensions is referred to in this report as the Client Difference Index (CDI).

In addition, a combined client profile is calculated. This combined profile consists of the average value of each dimension obtained from the experience and preference profiles. In those cases where the experience SICL is not administered, the combined profile is set equal to the preference profile.

The system uses the client and job profiles to obtain two numerical scores that indicate the "match" between a client and a job. These two numerical scores are calculated and defined as follows:

1) the correlation coefficient between the job profile and the client's combined profile is calculated and is referred to in this report as the Job Match Index (JMI), or simply the Match Index (MI). It is also referred to as the Suitability Index (SI).

2) the sum of the squared differences over the sixteen dimensions between the job and the client's combined profile is calculated and referred to in this report as the Job Difference Index (JDI), or simply the Difference Index (DI).

3.5 THE JOB CLUSTER REGISTER

Over the course of time that the Cleff Job Matching System has been developed and used, hundreds of individual jobs have been profiled using the JOCL instrument. These job profiles have been assembled into a glossary that is called *The Job Cluster Register*. The glossary consists of individual job descriptions grouped into 19 clusters or general job groups. Each cluster is numbered but does not have a name. Figure 3-4 shows the introductory page of the register and an example of one of the clusters. The cluster profiles were obtained by using cluster analysis. There are 525 unique jobs listed in the cluster register.

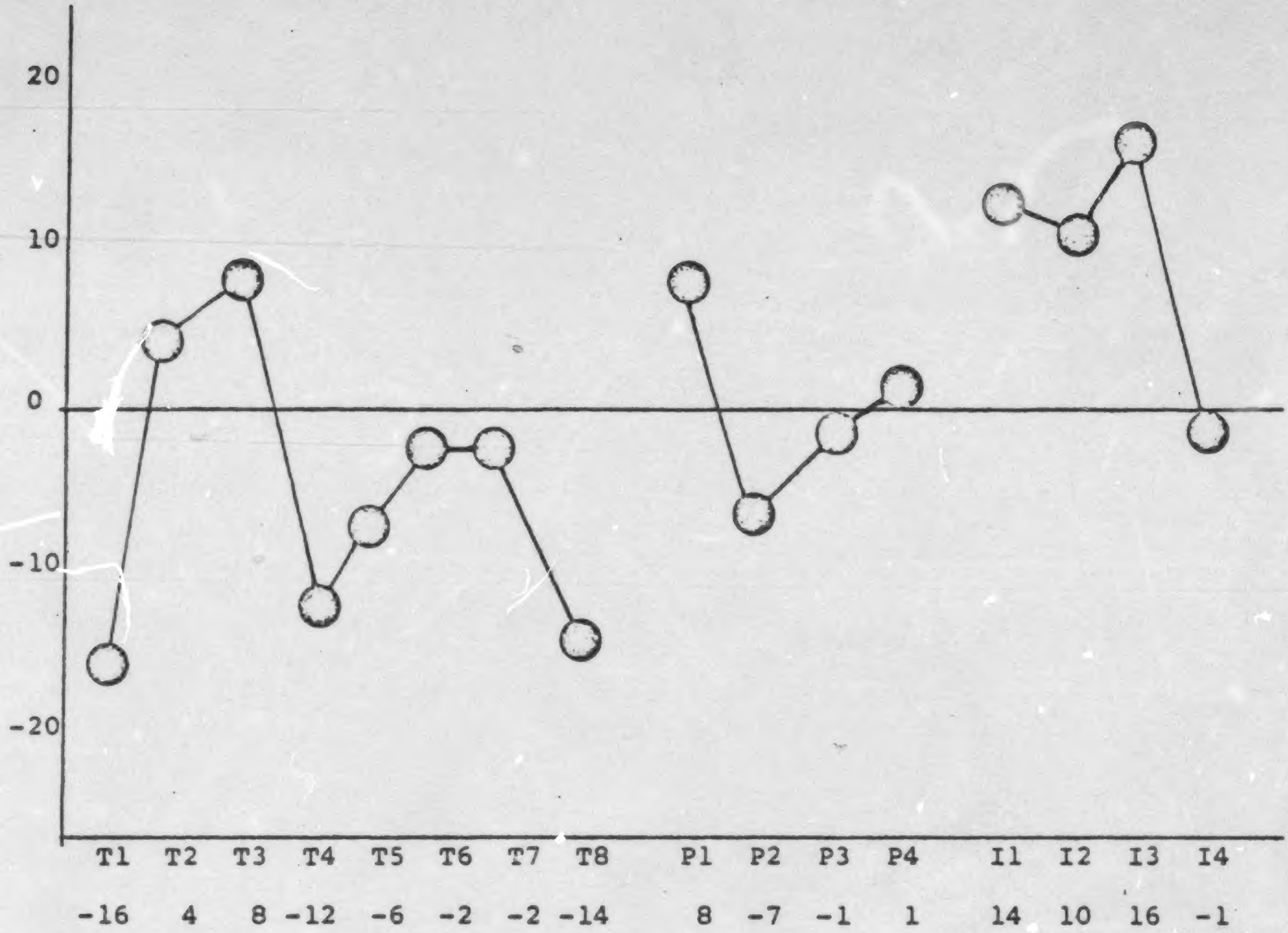
THE CJMS JOB CLUSTER REGISTER

The CJMS Job Cluster Register is a glossary of job listings sorted into general groups of jobs or "clusters". The computer print-out obtained from the Cleff Job Matching System provides the counselor with a match to a cluster number, and this register furnishes the descriptions of these clusters. Therefore, the register should be used only in conjunction with the Cleff Job Matching System to guide the individual in the selection of an occupation to meet his needs.

Beneath each cluster profile in the register, a listing of various jobs appears. These jobs were collected and then sorted into the clusters such that the correlation between the specific job profile and the cluster profile would be on the average +.90, and not less than +.80. This enables the counselor to suggest these jobs to the client as possible selections with a high degree of confidence. However, the job titles listed under each cluster should not be interpreted specifically, but rather generally, since they are meant to refer to "types" of jobs rather than one particular job. When used this way, the effectiveness of the CJMS Job Cluster Register is maximized as a tool for both the counselor and the client.

Figure 3-4· The CJMS Job Cluster Register

CLUSTER # 1



JOB TITLE	SUB TITLE	BUSINESS	DOT CODE
Bookkeeper		Industrial	210388
Bookkeeper II		Industrial	210388
Cashier		Lumber Company	299468
Cashier		Public Utility	299468
Cashier		Restaurant	299468
Checkers		Food Mart	
Clerk		Pharmaceutical Co.	
Clerk	Accounting	Chemical Co.	219488
Clerk	Accounting	Hospital Service	219488
Clerk	Actuarial	Insurance	219388

Figure 3-4.(continued)

Cluster # 1 (continued)

JOB TITLE	SUB TITLE	BUSINESS	DOT CODE
Clerk	Audit	Calculating	210388
Clerk	Billing	Chemicals	219388
Clerk	Bookkeeper	Bank	210388
Clerk	Bookkeeper	Lumber	215388
Clerk	Control	Communica. (W.U.)	219388
Clerk	Credit	Publishing	
Clerk	Currency Receiving	Bank	219485
Clerk	Discount	Bank	
Clerk	Electronic Billing	Communica. (W.U.)	219388
Clerk	General	Chemicals	214448
Clerk	General	Mail Order	209588
Clerk	General	Manufacturing	209388
Clerk	IBM Merchan. Control	Department Store	
Clerk	Lock Box	Bank	
Clerk	Mail	Insurance	
Clerk	New Accounts	Bank	
Clerk	Payroll	University	
Clerk	Receivables	Insurance Co.	
Clerk	Receptionist	Hospital	237368
Clerk	Records	Telephone Co.	
Clerk	Security Recording	Bank	
Clerk	Steel Pricing	Steel	209588
Clerk	Steno	Courts	202388
Clerk	Stock Transfer	Bank	
Clerk	Trainee		
Clerk	Transfer	Bank	
Clerk	Transit	Bank	
Clerk	Typist		
Clerk	Typist	ADP-Data Processing	
Clerk	Typist	Bank	209388
Clerk	Typist	Coll.of Medicine	209388
Clerk	Typist	Hosp.Serv.Plan	209388
Clerk	Typist	Instrument Co.	
Clerk	Typist	Manufacturing	209388
Clerk	Typist	Pharmaceutical	209388
Clerk	Typist	Public Utility	209388

Figure 3-4. (continued)

Cluster # 1 (continued)

JOB TITLE	SUB TITLE	BUSINESS	DOT CODE
Clerk	Typist	Trucking	209388
Clerk	Typist	University	209388
Clerk	Verifier/Mail	Department Store	
Collector		Bank	
Correspondent	Change	Insurance Co.	
Correspondent	Loans	Insurance Co.	
Correspondent	Pensions	Insurance Co.	
Evaluator	Safety Respons.	Public Works	
Operator	Billing Machine		214488
Operator	Keypunch	Bank	
Operator	Keypunch	Hosp.Service Plan	
Operator	Keypunch	Insurance	
Operator	NCR	Data Processing	
Operator	PBX	Hotel	
Operator	Proof Machine	Bank	
Operator	Telegraph	Communications	203588
Operator	Telephone	Commun. (W.U.)LA	
Operator	Telephone	Utility	
Operator	Teletype	Community Service	
Sales	Blueprint	Printing	289458
Secretary		Engineering	
Secretary		Instrument Co.	
Secretary	First	College of Medicine	
Secretary		Industrial	201368
Secretary	Personnel	Hotel	
Stenographer		Public Utility	
Teller	Assistant Savings	Bank	
Teller	Bank	Bank	212368
Teller	Bond	Bank	
Teller	First	Bank	
Teller	Savings	Bank	
Typist	Orders		

Figure 3-4.(continued)

If one examines the sample cluster shown in Figure 3-4, one sees that each job is identified in terms of a job title, a subtitle, a business definition, and a six-digit DOT code. Not all the jobs listed have subtitles and/or business definitions and/or DOT codes. Of the 525 jobs listed, 235 have a six-digit DOT code. The number of jobs listed under each cluster varies from 1 to 78. Neglecting the cluster with only one job title, the average number of jobs listed under each cluster is 29.1.

The cluster profiles provide a mechanism for matching clients to jobs in the absence of, or in addition to, actual job profiles obtained using the JOCL.

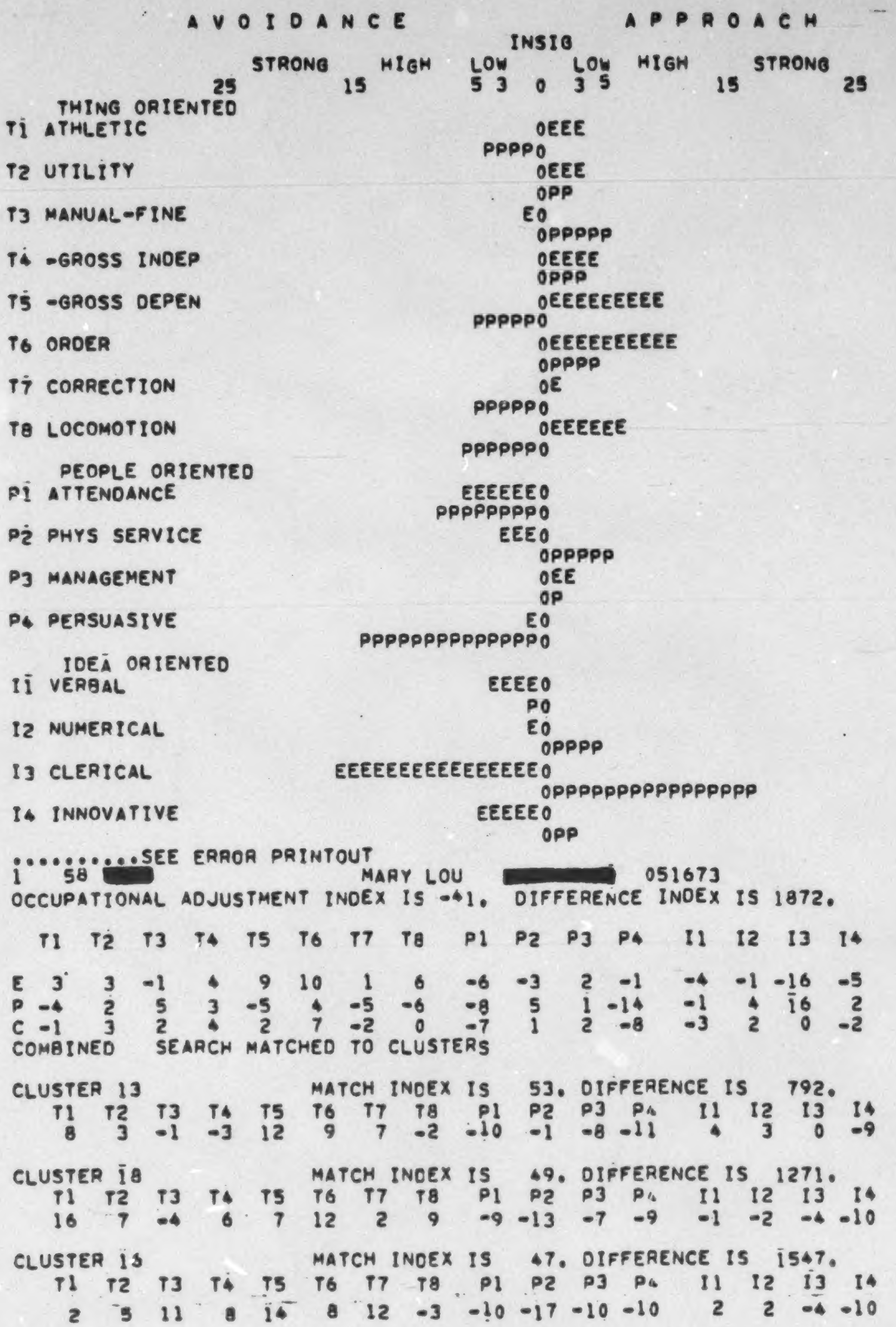
3.6 EXAMPLE OF A CJMS OUTPUT

Figures 3-5 and 3-6 show samples of CJMS printouts. Figure 3-5 shows an example of a client who completed both checklists matched to the Cluster Register. Figure 3-6 shows an example of a client who only completed the preference SICL matched to JOCL's. Both figures show an example of one approach to the presentation of the CJMS outputs. The figures show the following:

- The client's SICL dimension scores are presented both graphically (in the form of a histogram) and numerically. The histogram shows both the preference and experience scores for each dimension, using the letters P and E, respectively. The number of P's and E's printed corresponds exactly with the client's actual numerical dimension scores.

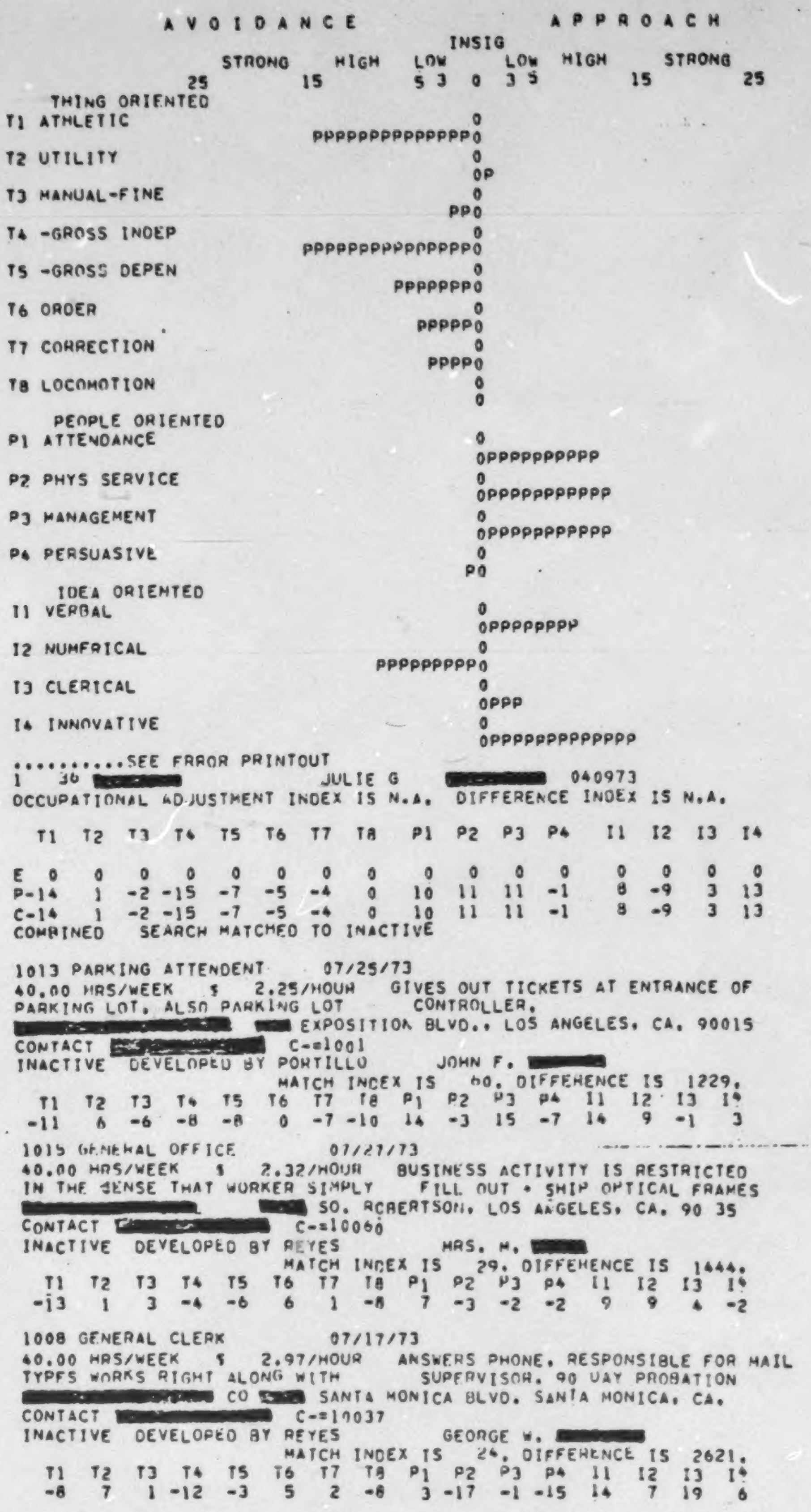
- The client's Occupational Adjustment and Difference Indices are shown. These indices only appear when the client completed both checklists. The example case, shown in Figure 3-5, shows that the client had an Occupational Adjustment Index of -41 and a Difference Index of 1872. The Occupational Adjustment Index as presented is 100 times the correlation coefficient value, i.e., 100 times -.41. Figure 3-6 shows that for a case where only the preference SICL was completed, these indices values are labeled NA for Not Applicable.

- The client's experience, preference, and combined dimension scores are presented numerically.



```
              A V O I D A N C E                 A P P R O A C H
                                       INSIG
                   STRONG    HIGH   LOW     LOW  HIGH     STRONG
                25        15        5 3  0  3 5        15        25
    THING ORIENTED
T1 ATHLETIC                              0EEE
                                     PPPP0
T2 UTILITY                               0EEE
                                         0PP
T3 MANUAL-FINE                          E0
                                         0PPPPP
T4 -GROSS INDEP                          0EEEE
                                         0PPP
T5 -GROSS DEPEN                          0EEEEEEEEE
                                    PPPPP0
T6 ORDER                                 0EEEEEEEEEE
                                         0PPPP
T7 CORRECTION                            0E
                                    PPPPP0
T8 LOCOMOTION                            0EEEEEE
                                   PPPPPP0
    PEOPLE ORIENTED
P1 ATTENDANCE                      EEEEEE0
                                 PPPPPPPP0
P2 PHYS SERVICE                       EEE0
                                         0PPPPP
P3 MANAGEMENT                            0EE
                                         0P
P4 PERSUASIVE                           E0
                           PPPPPPPPPPPPPP0
    IDEA ORIENTED
I1 VERBAL                            EEEE0
                                        P0
I2 NUMERICAL                            E0
                                         0PPPP
I3 CLERICAL                 EEEEEEEEEEEEEEEE0
                                         0PPPPPPPPPPPPPPPP
I4 INNOVATIVE                       EEEEE0
                                         0PP
..........SEE ERROR PRINTOUT
1   58 [redacted]             MARY LOU   [redacted]     051673
OCCUPATIONAL ADJUSTMENT INDEX IS -41.  DIFFERENCE INDEX IS 1872.

  T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4

E  3    3   -1    4    9   10    1    6    -6   -3    2   -1    -4   -1  -16   -5
P -4    2    5    3   -5    4   -5   -6    -8    5    1  -14    -1    4   16    2
C -1    3    2    4    2    7   -2    0    -7    1    2   -8    -3    2    0   -2
COMBINED   SEARCH MATCHED TO CLUSTERS

CLUSTER 13                  MATCH INDEX IS   53. DIFFERENCE IS   792.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
    8    3   -1   -3   12    9    7   -2   -10   -1   -8  -11     4    3    0   -9

CLUSTER 18                  MATCH INDEX IS   49. DIFFERENCE IS  1271.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
   16    7   -4    6    7   12    2    9    -9  -13   -7   -9    -1   -2   -4  -10

CLUSTER 15                  MATCH INDEX IS   47. DIFFERENCE IS  1547.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4

    2    5   11    8   14    8   12   -3   -10  -17  -10  -10     2    2   -4  -10
```

Figure 3-5. CJMS Printout: Example of Client Who Completed Both Checklists Matched to the Cluster Register



```
              A V O I D A N C E                   A P P R O A C H
                                         INSIG
                    STRONG    HIGH   LOW      LOW  HIGH     STRONG
                25         15        5 3   0  3 5        15        25
    THING ORIENTED
T1 ATHLETIC                                0
                             PPPPPPPPPPPPPP0
T2 UTILITY                                 0
                                           0P
T3 MANUAL-FINE                             0
                                         PP0
T4 -GROSS INDEP                            0
                            PPPPPPPPPPPPPPP0
T5 -GROSS DEPEN                            0
                                    PPPPPPP0
T6 ORDER                                   0
                                      PPPPP0
T7 CORRECTION                              0
                                       PPPP0
T8 LOCOMOTION                              0
                                           0
    PEOPLE ORIENTED
P1 ATTENDANCE                              0
                                           0PPPPPPPPPP
P2 PHYS SERVICE                            0
                                           0PPPPPPPPPPP
P3 MANAGEMENT                              0
                                           0PPPPPPPPPPP
P4 PERSUASIVE                              0
                                          P0
    IDEA ORIENTED
I1 VERBAL                                  0
                                           0PPPPPPPP
I2 NUMFRICAL                               0
                                  PPPPPPPPP0
I3 CLERICAL                                0
                                           0PPP
I4 INNOVATIVE                              0
                                           0PPPPPPPPPPPPP
...........SEE FRROR PRINTOUT
1   36 [redacted]              JULIE G     [redacted]    040973
OCCUPATIONAL ADJUSTMENT INDEX IS N.A.  DIFFERENCE INDEX IS N.A.

  T1  T2  T3  T4  T5  T6  T7  T8   P1  P2  P3  P4   I1  I2  I3  I4

E  0   0   0   0   0   0   0   0    0   0   0   0    0   0   0   0
P-14   1  -2 -15  -7  -5  -4   0   10  11  11  -1    8  -9   3  13
C-14   1  -2 -15  -7  -5  -4   0   10  11  11  -1    8  -9   3  13
COMBINED   SEARCH MATCHED TO INACTIVE

1013 PARKING ATTENDENT     07/25/73
40.00 HRS/WEEK   $   2.25/HOUR   GIVES OUT TICKETS AT ENTRANCE OF
PARKING LOT, ALSO PARKING LOT      CONTROLLER.
[redacted] [redacted] EXPOSITION BLVD., LOS ANGELES, CA, 90015
CONTACT [redacted]         C-=1001
INACTIVE  DEVELOPED BY PORTILLO       JOHN F. [redacted]
                          MATCH INCEX IS   60. DIFFEHENCE IS  1229.
 T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
-11   6  -6  -8  -8   0  -7 -10  14  -3  15  -7  14   9  -1   3

1015 GENERAL OFFICE         07/27/73
40.00 HRS/WEEK   $   2.32/HOUR   BUSINESS ACTIVITY IS RESTRICTED
IN THE SENSE THAT WORKER SIMPLY    FILL OUT + SHIP OPTICAL FRAMES
[redacted]  [redacted] SO. ROBERTSON, LOS ANGELES, CA. 90 35
CONTACT [redacted]          C-=10060
INACTIVE  DEVELOPED BY REYES            MRS. M. [redacted]
                          MATCH INDEX IS   29. DIFFEHENCE IS  1444.
 T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
-13   1   3  -4  -6   6   1  -8   7  -3  -2  -2   9   9   4  -2

1008 GENERAL CLERK          07/17/73
40.00 HRS/WEEK   $   2.97/HOUR   ANSWERS PHONE, RESPONSIBLE FOR MAIL
TYPES WORKS RIGHT ALONG WITH        SUPERVISOR. 90 DAY PROBATION
[redacted] CO [redacted] SANTA MONICA BLVD. SANTA MONICA, CA.
CONTACT [redacted]          C-=10037
INACTIVE  DEVELOPED BY REYES            GEORGE W. [redacted]
                          MATCH INDEX IS   24. DIFFERENCE IS  2621.
 T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
 -8   7   1 -12  -3   5   2  -8   3 -17  -1 -15  14   7  19   6
```

Figure 3-6. CJMS Printout: Example of Client Who Completed Only Preference SICL Matched to JOCLs

- The client's experience, preference, and combined dimension scores are presented numerically.
- The type of match is identified. Figure 3-5 shows a match that was run using the client's combined dimension scores and the Cluster Register. Figure 3-6 shows a match that was run using the client's combined dimension scores and the inactive JOCL file. In this case, the combined scores are equal to the preference scores because this was the only SICL completed.
- The clusters and/or JOCL's are displayed in descending order of the Job Match Index. The example shown in Figure 3-5 shows that the match with the highest value of the Job Match Index was to Cluster #13. The Job Match Index was 53 and the Job Difference Index was 792. Figure 3-5 shows that the cluster dimension scores for the top 3 cluster matches are displayed. The number of clusters displayed with their dimension scores can be varied.
- Figure 3-6 shows the match printout to jobs that have been JOCL'd. Each job has an identification number and a description. The JOCL dimension scores and the Job Match and Difference Indices are shown.

The computer printouts shown in Figures 3-5 and 3-6 are those utilized in the SER/Cleff experiment. These are modified versions of the printouts used in the New Jersey/Cleff experiment. The major difference is the incorporation of the histogram in the SER/Cleff printouts. The computer program utilized in the New Jersey/Cleff experiment was set-up using teletype input/output and was run on a commercially available time-shared computer. The program utilized in the SER/Cleff experiment was set-up to run in a batch mode and utilized facsimile equipment for input/output communication with the SER offices. These aspects of the operation of the Cleff Job Matching System are described in more detail in Part II of this report.

3.7 INTERPRETATION OF THE MATCH AND CLIENT SCORES

The discussion to this point has briefly described what the CJMS checklists look like; how they are completed; and how the system generates numerical scores relating client profiles to job or cluster profiles. The subject of this section is the interpretation of the profiles and profile-matching scores generated by the CJMS.

Appendix F presents a document that addresses, in detail, the interpretation of the system scores and their use in vocational guidance and placement. Ultrasystems strongly urges the reader to read this document. The document mainly discusses the interpretation of the individual client profiles (preference and experience) and the interpretation of the comparison of these profiles. The document has been written for use by vocational guidance counselors and, specifically, for use by such counselors who are working with physically or emotionally incapacitated (handicapped) people.

The document specifically states the following "rules of thumb":

1. *In using the CJMS ... any ... Occupational Adjustment Index score below +.25 is a strong indication that the client may indeed be occupationally maladjusted and is in need of special attention in the job matching process, as well as counseling help.* (Note: The Occupational Adjustment Index is the correlation coefficient obtained from the client's preference and experience profiles. It is usually referred to in this report as the Client Adjustment Index.)
2. *A client with a low Preference to Experience Index* (Occupational or Client Adjustment Index) *should not be referred into a job or type of job unless his Person to Job Match Index* (Job Match or Suitability Index) *is over +.60. This makes it even more certain that both* (the) *preference and experience* (of the person) *has some positive relationship to the requirements of the job, thus giving* (the person) *a chance to succeed at the job and to recover some personal stability.*

> 3. *A client with a very high Preference to Experience Index can safely be referred to a job where the Person to Job Match Index is as low as +.40, because (the person) will bring personal stability to the job situation.*
>
> 4. *The correlations called the Match Index (i.e., Job Match or Suitability Index) indicate to what degree the shapes of the profiles (i.e., clients combined profile and the job or cluster profile) are alike. The Difference Index (Job Difference Index) indicates the extent of the differences between profiles and helps to break ties between matches. For example, if a client's profile matches a number of jobs at approximately the same level of Match Index, the one with the smallest Difference Index would be the best match.*

The document in Appendix F also contains a table that relates the Job Match Index to the Job Difference Index. This table shows, for a given Job Match Index (between +.25 and +.94) what the median Difference Index is and what the normal range of the Difference Index is. The description accompanying the table states that the normal range indicates the expected distribution of the Difference Index for a specified Match Index, and further states that if the applicant's Difference Index exceeds the range for a given Match Index, there is likely to be a highly significant difference in one or more dimension comparisons and that this serves as a "red flag" to the interviewer. The description also states that the lower the Difference Index for a given Match Index is, the less the likelihood is that there is a major dimension difference between the applicant's profile and the job profile.

The use of Cleff Job Matching system for either matching a client to a job or for counseling a client in terms of vocational choice, involves the analysis of:

1) the individual client's profile dimension scores

2) the relationship between the client's preference and experience profiles

3) the Job Match Index and the Job Difference Index between the client's combined profile and the job or cluster profile

4) the relationship between the Job Match Index and the Job Difference Index

5) the relationship between the Job Match Index and the Occupational (Client) Adjustment Index

6) the relationship between the client's profile dimension scores and the job profile dimension scores.

The system is based on the profiles in terms of similarity of shape and magnitude of divergencies. The indices provide mathematical measures of the similarities and the divergencies. Examination of the profiles by inspection is used to determine divergencies and similarities in terms of individual dimension scores. In the most simplistic sense, the CJMS indicates the relative appropriateness of client-job matches by the degree to which the client and job profiles have similar shapes and dimensional magnitudes. Again, in the most simplistic sense, the higher the similarity and the smaller the divergence, the better the match. Taken to the limit, this simplistic interpretation would indicate that a Job Match Index of +1.0 and a Job Difference Index of zero represents a "perfect match." If this were accompanied by a Client Adjustment Index of +1.0 and a Client Difference Index of zero, one would also have a situation where a person's experiences and preferences are "perfectly matched."

The article shown in Appendix A and the report shown in Appendix B provide some further insights into the interpretation of the CJMS scores. Ultrasystems urges the reader to read these documents. In regard to interpretation, the documents provide data which shows the means and standard deviations of the system's scores associated with different definitions of good and bad matches. These data were obtained as part of the system's development.

There are two other points that Ultrasystems believes are worth mentioning before this section is concluded. These two points relate to the following subject:

1) the interpretation given to very high job match and Client (Occupational) Adjustment Indices

2) the specific job situation interpretation of the CJMS scores.

The first point refers to instances in which the Job Match Index and/or the Client Adjustment Index is, say, equal to or greater than +.8.

Whereas none of the documentation that Ultrasystems has addresses this point, we have been told during the training provided us by Dr. Cleff that this does not represent what one might otherwise expect, i.e., a Job Match Index of +.8 is not an excellent or relatively very good match, but is, in fact, a poor match. The terms "excellent" and "poor" match mean that instead of indicating that this client-job match will result in above-average job retention, performance, and client satisfaction, i.e., an excellent match, it will, in all probability, be just the opposite, i.e., a poor match. Ultrasystems' best recollection of the rationale behind this is that the high scores indicate "too much rigidity or too little flexibility on the part of the applicant in relation to the job." In other words, the applicant will not be able to properly respond to small changes in the job's requirements, changes which are not reflected in the job profile. The client is "too set in his/her ways." Ultrasystems realizes this isn't all that clear. The point has been discussed because Ultrasystems has been told that one cannot interpret the resultant scores in the simplistic sense described earlier, i.e., the higher the Match Index, the better the match.

The second point also stems from discussions between Ultrasystems' personnel working on this project and Dr. Samuel H. Cleff. In these discussions, Dr. Cleff has indicated that, in certain instances, the "best employees" are those whose match indices fall into some restricted range, i.e., say, between +.4 and +.5. This is different than the above point in that the range is well below the "too high point."

4.0 METHODOLOGY AND SCOPE OF THE EVALUATION

4.1 SCOPE OF THE NEW JERSEY EXPERIMENT AND EVALUATION

The basic objective originally established for this evaluation was "to determine whether the Cleff Job Matching System is superior to traditional placement methods." This statement of the evaluation's basic objective is taken from the Request For Proposal prepared by the U.S. Office of Economic Opportunity (see Appendix D). The evaluation was to have been done based on the results of the experiment that was conducted by OEO in conjunction with eight agencies in New Jersey. This experiment was run under contract to OEO by Automatic Data Processing Inc./Personnel Data Systems Inc. (ADP/PDS). The evaluation contract was awarded Ultrasystems, Inc. in late June of 1972 by OEO, based on a competitive procurement. The experiment had begun in June 1971 and thus had been under way for approximately one year at the time the evaluation contract was awarded.

A formal documented experimental design had been established and was to have been implemented by ADP/PDS in conjunction with the eight participating agencies. Briefly, the experiment was to use the Cleff Job Matching System to match and attempt to place 3,500 unemployed and underemployed poor persons. (See Appendix C for the Statement of Work incorporated into the contract awarded ADP/PDS, by OEO, for the experiment.) In addition, a control group of 800 people processed by the participating agencies, without the use of the CJMS, was to be established. The experiment was originally scheduled to be completed by the end of June 1972. In February 1972, the contract was modified so that the completion date was extended another four months. In October 1972, the contract was again modified, extending the completion date another 5 months. The modification executed in October 1972 also stated that the experimental usage of the CJMS was to end on or around the end of September 1972 and changed the sizes of the experimental and control groups, the latter change based on recommendations made by Ultrasystems. This will be explained later in this section. The discussion that follows describes the experiment as it was originally designed and as it was implemented prior to the last modification.

The experimental design called for a time-phased approach to the use and nonuse of the CJMS. Specifically, the experiment was to first obtain data on a total group of 200 clients processed by the eight participating agencies. This phase was to be followed by a period in which the CJMS would be used for an approximate total of 1,200 clients, by the eight agencies. This was then to be followed by another period where the CJMS was not to be used. This second control group period was to obtain data on a group of 400 clients. This was then followed by another experimental period where the CJMS would be used, again for approximately 1,200 clients. The next phase was to be a non-CJMS phase involving 200 clients, which was then followed by the use of the CJMS for the final 1,200 clients. In other words, there were to be three experimental phases, each of which was to involve one-third of the total group of 3,500 clients, and three control phases, two of which involved 200 clients each, and one of which involved 400 clients. The basic purpose of these phases was to enable one to analyze the resultant data to see if there was a beneficial spin-off associated with the use of the CJMS on the traditional agency placement process. This was referred to in the experimental design as a "Hawthorne Effect." In addition, the phasing of the experiment would enable one to determine if the results obtained with the use of the CJMS improved as experience with its use increased.

In addition to the phasing of the experiment, there were other design ground rules established as follows:

- Provide for a distribution of Black, Anglo, and Spanish-speaking persons in the experimental group that is consistent with the representation of each group among the unemployed and underemployed. (Note: The wording is taken from the Statement of Work established for the experiment.)

- Provide for a control group of persons proportionately representative of the experimental group. In other words, the control group clients were to have the same demographic characteristics distribution as the clients in the experimental group.

- Each of the three experimental groups was to consist of every agency applicant meeting both agency criteria and CJMS criteria for placement consideration, until one-third of each agency's quota was reached.

- The control group clients were to meet the same agency criteria for acceptance as the experimental group.

- The experimental group clients were to consist of all individuals processed through CJMS by each participating agency and who were referred either to jobs or to formal training on the basis of their match to jobs or training situations. An applicant will be referred only if the applicant shows a Suitability Index (Match Index) of 50 or higher to that situation, and has an Occupational Adjustment Index (Client Adjustment Index) greater than 25.

- Provide for referrals for both the experimental group and the control group to public and private sector jobs at a ratio of 1 to 2.

- Provide for recruitment, matching and job profiling through (1) the Business and Industrial Coordinating Council (BICC) of Newark, New Jersey, (2) Model Cities projects and (3) the New Jersey Rehabilitation Commission in groups of approximately 1000-1200 applicants for each of the above three organizations. The final referral and job placement to be the responsibility of each of the above organizations in accordance with their regular operating procedures.

The experiment was to obtain and provide the data generated and needed for the evaluation. All the data needed for the evaluation was not the responsibility of the experimental contractor. Specifically, the capture of the post-placement data needed for the evaluation was the responsibility of the evaluation contractor.

As stated above, the basic objective of the evaluation was to determine whether the CJMS is superior to traditional placement methods. Whereas the Request For Proposals for the evaluation did not explicitly state what the term "traditional placement methods" meant, it did describe, in general terms, the *Dictionary of Occupational Titles*. The RFP stated the following points relative to the *Dictionary of Occupational Titles (DOT)*:

- *The DOT was the first systematic attempt to get at the problem of improved job placement.*

- *The DOT is a classification scheme which arranges occupations according to their interrelationships, standardizes job titles, and defines, generally, what each job involves.*

- *As a tool for identifying occupational areas and the general kinds of job titles and jobs which occur, the DOT is useful.*

The RFP went on to state that:

- *The kinds of information available in the DOT appear to be of little value in attempting to match an individual person to an individual job at the entry or semi-skilled level. An example of this rigidity is that identical*

DOT codes assume identical job characteristics when, in fact, no two jobs are identical. Likewise, no two individuals are identical, yet the assignment of the same DOT code to two individuals assumes this univocal relationship.

- *Major weakness of other systems is that they require that people be described on the basis of job experience. This approach is highly questionable from several standpoints when used for matching at the entry and semi-skilled level.*

  1) *If an individual does not have any job experience, no match can be made.*
  2) *It assumes that an individual that does have job experience is only suitable for a job in the area of his experience.*
  3) *The primary mechanism for determining an individual's experience, suitability and likes and dislikes is the subjective judgment of a counselor/interviewer.*
  4) *Job Analysis tends to be based primarily on employer opinion of requirements rather than on scientific assessment of job content.*

The RFP then briefly described what was the rationale behind the experiment and its subsequent evaluation, i.e., to explore potentially more effective approaches to matching disadvantaged individuals and jobs and to address the above-stated problems. The experiment was to provide the data and the subsequent evaluation was to determine if the CJMS was superior to traditional job placement methods, based primarily on the comparison of subsequent job retention rates, job satisfaction, and job performance between the control and experimental groups. The traditional job placement methods would be whatever the participating agencies utilized prior to and between the use of the CJMS. In addition, other success criteria was also to be considered, such as placement rates and employer satisfaction with the system.

The New Jersey/Cleff experiment and its subsequent evaluation was therefore to be primarily a comparative analysis of the placement and post-placement results of the two client groups. Theoretically, at least, all, except the use and nonuse of the CJMS, between these two groups was to be assumed equal.

The research design established for the evaluation was essentially straightforward and traditional. Since the experiment embodied within its design the creation of the experimental and control groups, there was no sample selection required for the evaluation, i.e., the samples had already been chosen. In addition, the data needed to describe the socioeconomic characteristics of the clients, the referral and placement activities that took place and, for the experimental group, the CJMS profiles and scores associated with these clients and their referrals/placements, was to be provided by the contractor running the experiment. These data would be utilized to determine the following:

1) Statistical comparisons of the demographic characteristics of the experimental and control groups.

2) Statistical comparisons of the referral and placement activities of the experimental and control groups. This area of analysis includes such measures as:

    i. percent of clients referred to jobs and/or training

    ii. percent of clients referred who were offered jobs and/or accepted for enrollment in training

    iii. percent of clients referred who were placed into jobs and/or training

    iv. percent of clients who accepted job offer/training

    v. percent of clients who failed to report to work after accepting job or who failed to report to training after accepting

    vi. percent of total clients who were offered jobs/training

    vii. percent of total clients who were placed/enrolled in training

3) Statistical analysis of the referral and placement results of the experimental group clients as a function of the CJMS scores. This area of analysis includes such measures as:

    i. percent of referrals offered a job/training

    ii. percent of referrals offered a job/training who accept

    iii. percent of referrals who report to work/training after accepting a job/training offer

4) Statistical comparisons of the post-placement results of the experimental and control groups. The post-placement results are measured as follows:

   i. job retention rate
   ii. movement to a better job (salary, status, position, potential for promotion)
   iii. job advancement (promotion, salary increase)
   iv. client satisfaction with the job
   v. job performance

5) Statistical analysis of the post-placement results of the experimental group clients as a function of their CJMS scores. Uses the same post-placement measures as listed in 4 above and the CJMS score measures.

As has been mentioned earlier, the capture of the post-placement data was Ultrasystems' responsibility. These data were to be obtained through interviews to be conducted by Ultrasystems with the clients (both experimental and control) who had been placed, and with their on-the-job supervisors. These interviews would provide the data needed to measure job performance, job satisfaction, job advancement and retention. Interviews were to be conducted with the original on-the-job supervisor, regardless of the client's current employment status. Clients who had left their original job were to be contacted and interviewed. In addition, interviews were to be conducted with personnel officers from a selected sample of companies who had hired experimental group clients and with the staffs of the agencies who participated in the experiment.

In order to do the interviews with the clients (experimental and control), their on-the-job supervisors and personnel officers, it is absolutely necessary to have the data that identifies the individual client to be interviewed; the company and work-site where the client was placed; and the job into which the client was placed. It is also required that one have the client's home address and phone, so that one can attempt to locate clients who have left the job into which the agency had placed them. These data were to be supplied Ultrasystems by the contractor running the experiment.

As previously indicated, the New Jersey/Cleff experiment failed to capture sufficient data for the evaluation to be conducted according to the original statement of work and, hence, in accordance with the proposed research design. Ultrasystems did obtain and analyze data related to the referral and placement activities associated with the New Jersey/Cleff experiment and did conduct interviews with the staffs of the agencies participating in the experiment. No interviews were conducted by Ultrasystems with any of the clients placed by the agencies during the experiment; with any on-the-job supervisors; or with any personnel officers. The results of the activities completed by Ultrasystems, regarding the New Jersey/Cleff experiment, are presented in Part II, Sections 2 and 3. It should be pointed out that the data obtained from the New Jersey experiment were not sufficient for the post-placement analysis, i.e., items 4 and 5 above, nor for the referral/placement/CJMS score analysis (of the experimental group) as outlined in item 3 above. The contractor, ADP-PDS Inc., who conducted the experiment, submitted a final report to OEO in June 1973. This report contained data and analyses of the referral/placement activities of the experiment. In addition, their report presented an analysis of the comparative retention of a small sample of experimental and control group placements and of the retention of the experimental group hires. The analyses done by ADP-PDS, as presented in the final report, will be reviewed in Part II, Section 3. The data utilized by ADP-PDS in the comparative retention analysis were not supplied Ultrasystems.

The problems associated with the conduct of the experiment, in light of the requirements for the evaluation, were documented by Ultrasystems in a technical note submitted to OEO in August 1972. This technical note was based on Ultrasystems' initial visits to the agencies participating in the experiment. The purpose of these visits was to ascertain the status of the experiment, the procedures utilized in the experiment, and the availability and content of the data to be supplied. The technical note raised some serious questions and formed the basis for a series of discussions between OEO, Ultrasystems, and ADP-PDS, Inc. It should be noted that by the end of August 1972 the experiment was almost over. Therefore, whatever had happened regarding the manner in which the experiment had been conducted, could not be undone. The one area that was both crucial and apparently fixable was the data base that was needed to do the evaluation. Ultrasystems developed a data collection form that was to be utilized to record the data needed for the evaluation. This data form was to be used by the experiment's contractor to record the data needed to do many of the evaluation analyses and to enable Ultrasystems to locate the clients and supervisors to be interviewed. The technical note did, however, present what were, in Ultrasystems' opinion, some serious questions about the manner in which the experiment had been conducted. The most serious of these questions was concerned with the relationship between the CJMS client-job match scores and the actual job(s) or training that a client was referred to and, possibly, placed in. In order to do the analyses involving the CJMS match scores and the referral/placement outcomes and the post-placement outcomes, one needs to be able to match the client with the job and/or training program. The matching can be done using the JOCL-produced profile or the appropriate cluster profile. The actual implementation of the New Jersey/Cleff experiment did not result in a JOCL profile being obtained for every job opening and/or training program associated with the experimental referral groups and/or placements. It also did not appear that the job descriptions available from the data base would all be sufficient to enable one to assign each of them to a cluster.

In addition, the comparative experimental/control group analyses depend heavily on the differentiation between the two groups associated with the use and nonuse of the CJMS. In other words, it was, and still is, Ultrasystems' opinion that the cause-effect relationship between the referral/placement/post-placement outcomes and the use of the CJMS could not be inferred unless the resultant CJMS client and match indices were utilized to direct the referral process. The inferences to be drawn between the experimental and control group outcomes could not be solely due to the event of completing the SICL's and executing the CJMS match algorithm. The experiment had a specific ground rule that stated that a person would not be referred to a job and/or a training program unless the match index was greater than +.50 and the person's Occupational Adjustment Index was greater than +.25 (or maybe +.20, as indicated in ADP-PDS's first progress report). Ultrasystems, therefore, was concerned that unless the match indices could be definitively ascertained for each referral and placement, the value of the comparative analyses would be compromised.

There were some other problems associated with the experiment. Two of the more important ones were:

1) The fact that the control group for the agency that had, by far, the largest experimental group was composed of clients of another agency not participating in the experiment; i.e., the agency was BICC which accounted for 60% of the total experimental group of 2619 clients.

2) The fact that in all the participating agencies, except BICC, the CJMS was not given to every client in the timespan when the system was being used. The experimental design had stated that the experiment groups "will consist of every agency applicant meeting both agency criteria and CJMS criteria for placement consideration until...the particular agency quota had been set." The experimental design went on to state -

> *These experimental subjects are all those individuals processed through the CJMS by each participating agency and are referred either to jobs or to formal training on the basis of their match to job or training situation. An applicant will be referred only if he shows a Suitability Index of 50 or higher to that situation, and has an Occupational Adjustment Factor greater than 25.*

These statements do not imply that every person coming to one of the participating agencies is to be given the SICL's during each of the three experimental periods. In fact, the statements are not really very clear. The initial statement does clearly state that the person must meet the agencies' criteria. Therefore, it implies that each experimental group client will have been accepted by the agency and that the agency will undertake activities on behalf of each client, especially as regards job and/or training referrals. The statement that indicates the client is to also meet CJMS criteria for placement, is not so clear. What are the CJMS's criteria for placement? As stated by the system's developer, the CJMS has been developed to provide a means by which jobs and job applicants can be matched at the semi- and low-skilled levels. The completion of the SICL in written form requires a certain reading ability. However, the SICL can be administered orally when this condition is not satisfied. The cut-off criteria on Match Index and Occupational Adjustment Index require that the client complete both SICL's and that the client be matched against, at least, the cluster register. Thus the client has to take the SICL before these criteria can be applied. In fact, the experiment was conducted such that all clients who completed one or both SICL's were included as experimental group clients, regardless of their Occupational Adjustment Index. In a addition, in many of the agencies (excluding BICC and TOPS), it is a fact that not every client who was accepted by the agency during the experimental phases took a SICL. In fact, there were no experimental phases, as originally set forth, and Ultrasystems has never seen the quotas that were to be established for each agency.

It should be noted, however, that data to be obtained by Ultrasystems through the interviews to be conducted with clients and on-the-job supervisors could have been used to resolve several of these problems. Most importantly, the interviews could have provided a means for definitively ascertaining the client's Job Match Indices, either in terms of a cluster identification, or through the administration of a JOCL. However, in December of 1972, OEO decided that it was not cost effective to proceed with the client and the on-the-job supervisor interviews. Instead, OEO proposed a new evaluation scheme and directed Ultrasystems to redesign the evaluation, using their proposed scheme as a guide. Ultrasystems submitted a technical note in January 1973, in response to this request. In addition, Ultrasystems proposed that a new mini-experiment be conducted under the direction of Ultrasystems. This proposal was accepted. The so-called mini-experiment was to be conducted and evaluated by Ultrasystems. The experiment would be run in conjunction with four California offices of Project SER. This experiment and its evaluation will be described in the following section.

4.2 SCOPE OF THE SER/CLEFF EXPERIMENT AND EVALUATION

The basic objective of the SER/Cleff experiment was to obtain retention data on a set of 150 clients who were placed into jobs through the services provided by four offices of Project SER. Each of the 150 clients would have completed one or both SICL's, and each job that the client was placed into would be JOCL'd. The minimum retention span would be greater than six months, i.e., each client's retention would be tracked for a minimum of six months after hire, or until termination, whichever came first. The basic objective of this experiment was, therefore, to obtain sufficient data to analyze the relationship between the CJMS client-job match scores and the resultant retention. The experiment and its evaluation did not call for interviews with those clients who were placed and their on-the-job supervisors, for the purpose of obtaining post-placement measures of job performance and satisfaction. In addition, the experiment did not include a control group.

The implementation of the SER/Cleff experiment resulted in the tracking of 142 placements for a minimum of 14 months.

The new experiment and evaluation differed substantially from the New Jersey experiment and evaluation in its basic design and philosophy. For one, no cut-off criteria were established for the SER experiment. In other words, no minimum values of the CJMS indices were established to govern the referral process. In addition, the job profiles would be obtained after the fact, i.e., after the client had been placed.

Thus, the SER/Cleff experiment was aimed at providing data to enable one to analyze the ability of the CJMS to predict subsequent job retention. It was not designed to test the hypothesis that the CJMS is superior to traditional job placement methods. The New Jersey/Cleff experiment was based, in Ultrasystems' opinion, at least implicitly, on the fact that the CJMS does, if utilized according to its design, provide measures that predict, in a relative sense, the level of retention, satisfaction and performance of job-client matches. The New Jersey/Cleff experiment and evaluation was, then, to test the hypothesis that the use of the CJMS, according to its design, provides manpower personnel with decision-making information that they do not ordinarily possess or use. The SER/Cleff experiment was, in a sense, going back to square one in that it was to determine if a relationship does, in fact, exist between the system's match and client measures and the eventual retention of job placements.

The SER/Cleff experiment would, because it established no CJMS index criteria for referrals, enable one to obtain data on the matches that manpower personnel do, in fact, make, viewed from the standpoint of the CJMS measures. However, as was pointed out in the conclusions section, one cannot infer from this that these are the matches that the manpower personnel considered to be "the best." There are many other factors associated with client-job matching that were not measured. One of the most important of these is the availability of job openings at the time the client was to be referred. In other words, the SER/Cleff experiment did not obtain data that would enable one to know the alternatives that were available at the time the client was referred. Thus, matches could have been severely constrained by the availability of job openings and the client's need for a job.

The design and execution of the SER/Cleff experiment and its evaluation both gained and suffered because of Ultrasystems' exposure to and analysis of the New Jersey/Cleff experiment. The conclusions reached by Ultrasystems include several associated with the experimental and evaluative methodologies that, in our opinion, would work best for ascertaining the effectiveness and usefulness of the Cleff client-job matching system and, in fact, other matching systems. These conclusions are the benefit of hindsight. As stated earlier, the SER/Cleff experiment benefited and suffered from the lessons we believe we had learned from the New Jersey experiment. The lessons learned from the New Jersey experiment manifested themselves in the design of the SER/Cleff experiment as follows:

1) Ultrasystems was convinced that the administration of SICL's and the capture of the required data could best be done if it was made the sole responsibility of a given person at each office participating in the experiment. Therefore, the experiment provided for such an individual in each of the four SER offices participating in this experiment. These people were employed by Ultrasystems but were selected by the SER offices, based on a job description and requirements set forth by Ultrasystems.

2) Ultrasystems was convinced that brief, one-shot, or even a few repeated training sessions, were not adequate. Therefore, the SER experimental methodology included, in addition to an initial training session at each SER office, the hiring of one of the senior counselors from BICC to provide continuous instruction on the use of the system for the entire period during which the SICL's were being administered. This individual, Mr. Ron Harris, also provided training on the administration of the JOCL's. Mr. Harris had been involved with the use of the CJMS at BICC for approximately two years prior to his joining Ultrasystems for work on this experiment. He had personally administered the major portion of the JOCL's done by BICC. His qualifications were heartily endorsed by the senior personnel at ADP-PDS. The initial training was given to the SER office staffs by Mr. Michael Youchah of ADP-PDS.

3) The operation of the New Jersey/Cleff experiment convinced Ultrasystems of the necessity of maintaining an independent set of client files to provide the data necessary for the evaluation. Of paramount importance was the capture of the data that definitively described the job that a client was placed into. Since the SER/Cleff experiment called for the JOCL's to be administered after the fact, it was imperative that data be captured that provided Ultrasystems with the job title, employer name and address, and supervisor name for the SER clients hired. The people employed by Ultrasystems, who worked in each SER office, were, in addition

to their duties associated with the administration of the SICL's, responsible for maintaining these records.

4) Responses obtained from personnel of the New Jersey agencies associated with the initial experiment, prompted Ultrasystems to modify the ADP-PDS CJMS computer program to include the pictorial (histogram) presentation of the client's experience and preference scores. The match printouts shown in Section 3 of this part of the report are examples of those generated as part of the SER experiment.

The lessons not learned from the New Jersey experiment regarding the design and execution of both the SER experiment and its subsequent evaluation are not as straightforward, or at least as simply stated, as the lessons that were learned. The basic objective of the SER/Cleff experiment, coupled with the facts that (1) no cut-off criteria were established governing the CJMS scores and referral decisions, and (2) no control group was to be established for comparative analyses, should have led us to conclude that the provision of CJMS scores and cluster match information to the counselors of SER was not of critical importance. In fact, it was probably not required at all. The SER/Cleff experiment was really only concerned with obtaining the CJMS scores for the clients and the job they were placed into, along with their subsequent retention. Thus, it was not necessary that either the clients or their counselors be provided with the CJMS outputs, since it was not necessary that the CJMS be used in the referral process. A considerable amount of time and resources were expended in the areas of counselor training and CJMS computer processing associated with the experiment. In its execution, the SER/Cleff experiment was conducted as if this was to be a real-world experiment in the use of CJMS, but the evaluation was conducted to test the hypothesis that the CJMS match scores are predictive of relative levels of retention. The reasons why this was done are basically as follows:

1) Ultrasystems attempted to incorporate the lessons we learned from the New Jersey experiment into the SER experiment, with the idea that we would set up a better experiment. We failed to explicitly realize that this was not what the SER experiment was all about.

2) In soliciting the agreement of the national SER office and the four local SER offices to allow us to conduct the experiment within their operational procedures and with their clients, it was necessary that the SER offices have an opportunity to use the system. They (the SER offices)

were interested in exploring the use of the CJMS as a tool to assist them in their operations. Ultrasystems explicitly stated, to the SER personnel, that we could not and would not vouch for the usefulness and effectiveness of the CJMS. Thus, we made no claims as to the system's validity. Instead, we tried to make it clear that the purpose of the evaluation was to provide some measure of the system's effectiveness. The experiment operated in a shadow area between actual use according to the system's design, and no use, (i.e., operations solely devoted to the collection of SICL scores, JOCL scores, and retention data).

It is essential to point out, that it is Ultrasystems' opinion, that this lack of clarity regarding the true purpose and execution of the experiment has no effect on the analyses done with the data obtained. The SICL's were administed by trained personnel according to the system's design. The JOCLs were administered, after the placement, by Ultrasystems' personnel trained in their administration. The retention of the individuals was obtained directly from the employers, by Ultrasystems. The three essential ingredients for the analyses were not compromised in any way by the use made of the system by the SER counselors.

There were some other aspects of the SER/Cleff experiment that deserve mention in the context of lessons not learned from the New Jersey experiment, and/or lessons learned from the SER experiment. These are as follows:

1) The retention follow-up data was obtained through telephone contact with those employers who hired clients and who completed the corresponding job JOCL. These telephone contacts were made at four points in time. At the first time point, i.e., December 31, 1973, all the employers who had hired clients and had completed the corresponding job profile were contacted. At each subsequent time point, only those employers who reported that one or more clients were still working at the preceding time point, were contacted. Once an employer indicated that the client or clients hired by them had all terminated, they were no longer contacted. It turned out that on at least two occasions employers who had previously indicated that the client was still working, as of the preceding contact time point, now indicated the client had terminated prior to that time point. This was due, they said, to a time delay associated with the processing of their termination records. This is a general type problem associated with retention tracking, and has, obviously, no relationship to the CJMS. It can lead, however, to the incorrect recording of subsequent retentions.

2) In contacting employers to obtain retention follow-up data, Ultrasystems also asked for the reason for the termination. There were many such reasons obtained. Some of these are not that definitive, i.e., quit, no reason given; went on personal leave--never returned; personal reasons. The purpose behind this was to provide data that could be utilized to determine if the termination was related to the measures of the CJMS or was due to some other reason not measured by the CJMS. As an example, terminations due to pregnancy, due to lack of driver's license, or due to falsification of a birth certificate, are, in our opinion, terminations not associated with the characteristics measured by the CJMS. Because it is difficult, if not impossible, to consistently obtain termination reasons that are clear enough to decide whether they are associated directly with the measures provided by the CJMS, it becomes difficult to make these distinctions in the analyses. In addition, Ultrasystems is aware, based on readings of other research/evaluation activities, that one can obtain different answers from employers and employees about the same event. There is a difference in perspective between the two. Ultrasystems has no way to know the extent of these differences for this evaluation, as clients were not contacted regarding the reasons for termination.

3) In tracking retention of clients employed at a given company, one is faced with a decision related to determining, if still employed, what job they are employed in, and when did a job change or changes occur (if they did). In doing this evaluation, Ultrasystems did not grasp the significance of this. Therefore, our retention was done in terms of working or terminating from the company, and did not explicitly determine if job changes within the company had occurred. This issue is considered, by Ultrasystems, to be of considerable significance, since the CJMS is matching a given client to given jobs, i.e., not to the company. The movement of a person to a "better" job within a company could be, and probably is, a good measure of the quality of the initial match. However, one cannot assume that job changes are always upward or to a better job. In addition, one needs to be concerned that if a job change occurred and then if a subsequent termination occurred, it could be due to the client's match to the new job within the company, and not to the job for which the original match was made. Thus,

one really needs to obtain the CJMS measure of the new job-worker match. In this evaluation, this was not done and it is not definitely known whether the terminations recorded occurred with the client being terminated from the original job or a different job. The analysis of CJMS match and client indices versus retention could be in error, since it analyzes the retention versus the CJMS match indices obtained, using the original job profile. This aspect of retention (or other post-placement measure) analysis was never explicitly dealt with in either the New Jersey evaluation design or in the SER evaluation design.

Sections 4 and 5 of Volume II of this report discuss, in more detail, the SER/Cleff experiment and evaluation.

EVALUATION AND ANALYSIS
OF THE
CLEFF JOB MATCHING SYSTEM

Final Report

VOLUME II: TECHNICAL DISSERTATION AND APPENDICES

Contract No. B2C 5415

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This report presents the results of an evaluation of the Cleff Job Matching System (CJMS) conducted by Ultrasystems, Inc. for the U.S. Department of Labor. The CJMS provides a means by which jobs and job applicants can be matched at the semi- and low-skilled levels in both white- and blue-collar jobs. The CJMS operates by obtaining numerical profiles of both job seekers and jobs; across 16 Dimensions of Work; from self-completed paper-and-pencil questionnaires. The job and job seeker profiles are compared by correlation and difference statistics to rank order matches. The analysis of the validity of the job seeker/job profile match statistics, provided by the CJMS, as a predictor of the retention potential of subsequent job seeker/job matches was undertaken by tracking the retention of 142 job seekers over a period ranging from 14 to 21 months. The CJMS measures were found to provide statistically valid indicators of retention. In addition, interviews conducted with the staffs of manpower and vocational rehabilitation agencies who used the CJMS indicated that these personnel found the CJMS to be useful in asssessing individuals and providing vocational counseling. Based on the results of this evaluation, it is Ultrasystms' opinion that the CJMS should be considered for use in labor exchange activities of the U.S. Employment Service, CETA prime sponsors and other manpower programs. Volume I presents the findings and conclusions and descriptions of both the CJMS and the evaluation. Volume II contains the technical dissertation.

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1.0 INTRODUCTION

The detailed analyses undertaken in this evaluation are presented in this, the second volume of the final report. The major topics covered are:

1) The attitudes and opinions of the staff of the agencies in New Jersey that participated in the original OEO-Cleff experiment. The organization of these agencies and the manner in which they operated the Cleff Job Matching System is also discussed. (Section 2)

2) Analyses of the New Jersey agency's activity data obtained as part of the OEO-Cleff experiment. This will also include a review of the ADP-PDS documentation and analysis of the New Jersey-Cleff experiment. (Section 3)

3) The organization and operation of the SER-Cleff experiment. (Section 4)

4) Analyses of the data obtained from the SER-Cleff experiment. The primary analyses to be presented involve the determination of the effectiveness of the CJMS in predicting the resultant retention of job-client matches. (Section 5)

2.0 THE NEW JERSEY/CLEFF MATCHING SYSTEM EXPERIMENT: AGENCY OPERATIONS AND STAFF ATTITUDES AND OPINIONS

As has been discussed earlier in this report, the evaluation of the New Jersey/Cleff experiment was the original purpose of this contract. Since we have already discussed the events that led to the changes in the scope of this contract, we will not repeat the story here. However, before we present the analyses that were done relative to the evaluation of the New Jersey experiment, it is important that the reader keep the following points in mind:

1) No quantitative data regarding the effectiveness of the Cleff Job Matching System was obtained from the New Jersey experiment.

2) There were substantial differences in the extent to which the different agencies in New Jersey used the Cleff Job Matching System and in the manner in which they used it.

3) The OEO-funded experiment was run by the company that was marketing the Cleff Job Matching system. The company was Personnel Data Systems and was a subsidiary of a larger company, i.e., ADP Incorporated. (The company that ran the experiment is hereinafter referred to as ADP-PDS.) The experiment was to provide data for use by Ultrasystems in evaluating the system. The experiment had been under way for approximately one year prior to the date the contract commenced. The capture of the required data was the responsibility of ADP-PDS, not of the agencies involved. The evaluation required other data that was to be obtained by the evaluation contractor, i.e., Ultrasystems, Inc. This data was essentially involved with obtaining measures of post-placement performance, i.e, retention, satisfaction, and on-job performance. The data was to be obtained via interviews with employers (e.g., mainly on-job supervisors) and clients. The capture of the information required so that the clients and employers to be interviewed could be identified and located was the responsibility of ADP-PDS.

4) Whereas the New Jersey experiment did not provide any quantitative data that could be utilized to evaluate the effectiveness of the Cleff system, it does provide some valuable insights into the realities of using this system within a manpower setting. This was, in fact, one of the objectives of the original experiment. It was not the prime objective, however.

Ultrasystems utilized this information in designing and operating the SER-Cleff experiment.

5) It is Ultrasystems' opinion that the reasons for the failure of the New Jersey experiment should be studied by U.S. Department of Labor personnel who are involved in implementing evaluations of man-job matching systems.

The remainder of Section 2 is devoted to:

1) a description of the operations of the agencies involved in the New Jersey/Cleff experiment, and

2) the presentation of the attitudes and opinions of the staff of these agencies regarding the Cleff system.

Section 3 presents the analysis of the data that was provided Ultrasystems regarding the New Jersey/Cleff experiment.

2.1 DESCRIPTION OF OFFICE OPERATIONS AND STAFF REACTIONS: NEW JERSEY/CLEFF EXPERIMENT: BACKGROUND INFORMATION

The Statement of Work set forth in the RFP for this evaluation included the following analytic questions:

- *Does the use of CJMS produce any changes in the agency's operations?*
- *Are there "Hawthorne Effects" or other interactions between the CJMS and traditional agency operations?*
- *What do the placement agencies think of the CJMS?*

Thus the evaluation had, as part of its original design, the execution of on-site interviews with staff members of the agencies participating in the Cleff experiments aimed at obtaining information so the above questions could be answered. One should bear in mind that the above analytic questions were formulated under the assumption that the participating agencies were using the Cleff system in accordance with the basic experimental design that had been developed. Shortly after Ultrasystems was awarded this contract, the participating agencies were visited by Ultrasystems staff so that firsthand knowledge could be obtained regarding the status of the experiment. The information obtained as a result of these visits was documented in a technical note submitted in August 1972. This document led to the eventual changes that were made in the evaluation's design.

The actual staff interivews were not done until approximately six months later, i.e., after the original evaluation design had been modified.

The revised evaluation design promulgated by OEO proposed the following questions:

1) How was CJMS implemented?
2) To what extent was CJMS administered?
3) What advantages of CJMS were noted?
4) What disadvantages of CJMS were noted?
5) To what extent is the system useful for this type of an organization?

Accordingly, Ultrasystems set out to find what had happened with the CJMS in the participating agencies and what the staff of these agencies thought of the system. Specifically, our objectives were to:

1) Obtain a description of how the CJMS was used by each agency participating in the experiment. This description includes, but is not limited to, the following key points:
    a) The criteria, if any, applied to the selection of clients by the agency and the reasons why this was done.
    b) The use made of the results of the CJMS scores. Basically, this involves determining if the system output was used as a counseling aid, as a matching criterion vis-a-vis job openings, and/or as a guide for job development activities.
    c) The effect agency constraints and operational requirements had on system usage.
    d) The effect that local labor market conditions had on the system's usage.

e) The extent of CJMS usage by the agency's staff in terms of the number of counselors and/or job developers who have used the system and the percentage of their clients to whom SILLs were administered.

2) The attitudes and opinions of the agency management and staff regarding the usefulness of the CJMS. This involves the determination of staff experiences using the system, their assessment of the validity of the system's output and the relationship between the Cleff system's output and "test" results that they may use to assess client aptitudes and job/training needs and potential. It also involves obtaining staff attitudes and opinions related to the system's overall advantages and disadvantages and obtaining their assessment of the system's effectiveness in terms of eventual client job retention and satisfaction, employer and client feedback, and comparison with other matching and/or counseling systems.

The following sections will respond to these objectives.

2.2 INTRODUCTION TO THE NEW JERSEY MANPOWER AGENCIES INCLUDED IN THE STUDY

In January 1973, Ultrasystems staff members visited the offices that were using the Cleff Job Matching System or who had participated in the OEO/ADP Cleff Job Matching System experiment. These offices are listed in Table 2-1. It should be noted that over two years have elapsed since these interviews were conducted. What has happened with these agencies and what they have done regarding using the CJMS is not known.

Two of the offices shown in this table, Atlantic City Model Cities Vocational Rehabilitation (ACMC) and Cape May Vocational Rehabilitation (CMVR), are outreach offices for the Atlantic City Vocational Rehabilitation (ACVR) Agency and are supervised by this office. The Atlantic City Model Cities VR office was not visited. Staff members of this office were interviewed at ACVR where they were attending a general staff meeting.

All of the offices except those in Atlantic City had "officially" stopped using CJMS at the time of these visits, since the experiment had reached the end of the OEO funding period. Several offices, however, still had CJMS terminal equipment on site and were able to access the computer so they could still perform CJMS scoring and matching. The Atlantic City Vocational Rehabilitation agencies had elected to continue using CJMS and had budgeted funds for CJMS. This was the only agency that had elected, at the time of the interviews, to purchase the system and allocate funds for its operation.

TABLE 2-1

CJMS PARTICIPATING AGENCIES AND AGENCIES INTERVIEWED

Agency Number	Abbrev. Title	Agency Name and Address
1	BICC	Business and Industrial Coordinating Council 50 Branford Place Newark, New Jersey
2	ACMC	Atlantic City Model Cities 27 N. Massachusetts Ave. Atlantic City, New Jersey
3	ACVR	Atlantic City Vocational Rehabilitation 1601 Atlantic Ave. Atlantic City, New Jersey
3	CMVR	Cape May Vocational Rehabilitation Cape May Courthouse, New Jersey
4	JCVR	Jersey City Vocational Rehabilitation 2853 Kennedy Blvd. Jersey City, New Jersey
5	NBVR	New Brunswick Vocational Rehabilitation 63 Morris St. New Brunswick, New Jersey
6	PAMC	Perth Amboy Model Cities (Diagnostic and Employment Center State of New Jersey Rehabilitation Comm.) 262 State St. Perth Amboy, New Jersey
7	TOPS	Typing & Office Preparatory Skills Training Program 506 Park Ave. Hoboken, New Jersey
8	FOCUS	Field Orientation Center for Underprivileged Spanish 469 Broad St. Newark, New Jersey

At least two other agencies indicated satisfaction with the system and were certain they would purchase it; however, they were in the midst of funding crises which constrained them from purchasing the system. Whether they did or not is not known. Two other agencies had stopped using the system and had no intention of expending their own funds to purchase the system, and the remaining agencies had not arrived at a decision as to whether they should continue or terminate the system.

Response to the system in all agencies visited was strong and it appears that, conceptually, CJMS has much to recommend it. However, mistakes were made in its introduction and operation which placed constraints upon its acceptance. Where these constraints did not work against acceptance, imaginative use was made of CJMS. In some agencies, however, these constraints acted to obviate acceptance which in turn caused the user staff to dwell on these constraints to the detriment of the system.

2.3 GENERAL DESCRIPTION OF THE AGENCIES INVOLVED IN THE NEW JERSEY CJMS EXPERIMENT

The specific components of the Cleff Job Matching System were discussed in Vol. I and will therefore not be repeated here. However, it may be helpful to the reader in understanding what follows to get a general idea of the procedures to be detailed. Generally, each agency involved in the CJMS experiment operated in the same manner as they did before the experiment began, i.e., before they began to use the CJMS. No attempt was made by any of these agencies to change the types of clients they would seek to serve as a result of the use of the CJMS. Each agency made its own decisions regarding how it was to be decided that a given client took the Self Interview Checklist (SICL). All agencies were aware of the possibility of administering the SICL orally but, to our knowledge, only one agency ever continued to do this after an initial experience with this approach.

The SICL's were usually administered within the agency by agency personnel, and the SICL responses were then transmitted by teletype or mail to ADP-PDS for processing. The resultant scores were transmitted back to the agency, usually by the same means as was used to input the original responses.

The Job Outline Checklist (JOCL) was utilized by only one of the agencies. Thus, for the other agencies, the SICL's were matched against the Job Cluster Register rather than against unique outlines obtained by agency personnel.

Each agency was given initial training in the use of the CJMS and could then continue to contact ADP-PDS to obtain answers to additional questions. In addition, several follow-up training sessions were provided. Each agency had considerable freedom in determining how and to whom to administer the SICL. Thus, the manner and order of administration of the SICL varied between agencies and between different staff members at a given agency.

These very general patterns apply to both the Vocational Rehabilitation and Community Agencies involved in the experiment. The following will first describe in general terms the operations of each of the agencies independent of their operation of the CJMS.[1] This will then be followed by a description of the manner in which they administered the Cleff Self-Interview Checklists.

2.3.1 The Community Agencies

Each of the three community agencies has its own separate and individual mission, although all are concerned with assisting the disadvantaged within their service areas to become vocationally viable and to obtain jobs. Each of the agencies visited was faced with cutbacks in operating funds and, in turn, cut down on the number and variety of services it is able to offer.

2.3.1.1 Business and Industrial Coordinating Council (BICC)

The Business and Industrial Coordinating Council (BICC) is sponsored by a coalition of businesses in the Greater Newark area. This was one of the first agencies to begin using CJMS and it participated in early development. BICC's experience with the evolving CJMS was promising and encouraged OEO to fund the CJMS experiment. In general, BICC serves a primarily black disadvantaged community in Greater Newark. It acts as a liaison between business and the community for the purposes of increasing the availability of training programs and employment opportunities for members of the minority community. It also assists local businesses and public agencies in efforts to increase minority representation on their staff in compliance with EEOC criteria. In addition, BICC tries to rally community support for obtaining improvements in the Newark School System, day care availability, and number and quality of training programs. In direct support of these ends, it provides employment counseling, referral, job development, and some training services to the community at large.

CJMS was introduced into the agency in 1970, and, at that time, employment services were considered to be a minor function of the agency. Concurrent with the use and development of CJMS, employment services began to assume a larger role in the agency's operation until, as of the time of Ultrasystems' visit to the agency, it became a major function of the agency. This change in emphasis cannot be entirely attributed to CJMS, since the agency is presently experiencing difficulty in obtaining operating funds from its sponsors as well as other sources. It had gone from a paid staff of fourteen to two persons at the time of the visit. OEO's funding of the CJMS experiment in this agency has undoubtedly influenced the present emphasis.

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[1] The agency descriptions have been written in the present tense. However, we are reporting what the procedures were at the time of our visits. What they are now we do not know.

The agency's director and counselor were interviewed, as well as a member of its executive board and several former counselors who are no longer with the agency. It is interesting to note that the former counselors, although no longer associated with the agency (due to budget cutbacks), had very favorable opinions about CJMS.

2.3.1.2 Field Orientation Center for Underprivileged Spanish (FOCUS)

FOCUS is comparable to BICC, but its emphasis is primarily directed to Newark's Spanish-speaking population. It has been in existence for approximately five years and participated in the OEO/CJMS experiment from April 1972 to November 1972. FOCUS provides non-stipend training, employment services, general community services, and represents the Spanish-speaking population of the Greater Newark area in matters of housing, public health, public assistance, and civil rights.

Approximately 90 percent of FOCUS's clients have less than a ninth-grade education, and a corresponding percentage do not speak English or have limited fluency in English. Of this percentage, approximately 15 percent are functionally illiterate or cannot read or write English or Spanish. Although 50 percent can read some English, the training provided includes typing, clerical and secretarial skills, English As a Second Language (ESL), and a general educational development course leading to a high school equivalency certificate (GED). The training is offered in both day and evening sections. FOCUS is unable to pay a stipend to students in these programs and reports difficulty in getting clients to enroll in them. Clients requiring training but who are unwilling to enroll in training without stipends are referred to TEAM or the Employment Service. FOCUS provides interviewing, counseling, job development, and referral services for their clients. In addition, FOCUS is able to develop a few OJT jobs, but their experience in this area is very limited.

2.3.1.3 Typing and Office Preparatory Skills Training Program (TOPS)

TOPS is a training center located in an old school building in Hoboken, New Jersey. It provides MDTA training in office and secretarial skills, as its name implies, and some counseling and job development services for its students. Since it is primarily a training institution, services are restricted to those accepted for training and are primarily training related. Clientele is mainly Spanish speaking and classes are offered in both day and evening sessions.

TOPS accepts as students individuals referred by CEP, Model Cities, and other public programs and walk-in applicants who meet appropriate criteria for the disadvantaged.

TOPS has used the CJMS to supplement its regular screening process; viz., applicants for training are interviewed, tested to determine educational level (Metropolitan Achievement Test) and interest (CJMS), and accepted or not accepted for training. Those individuals not accepted for training are referred to other agencies for service if appropriate, and those accepted for training are assigned a class and training period. Persons referred by agencies, such as CEP, are accepted and assigned training regardless of findings during screening as a result of contractual obligations with these agencies.

The agency at the time of our visit was not using CJMS, since the OEO experimental funding had ceased.

2.3.2 The Vocational Rehabilitation Agencies

Six of the agencies visited are actually State Vocational Rehabilitation offices of the New Jersey Rehabilitation Commission. With the possible exception of the Atlantic City Model Cities (ACMC) and the Perth Amboy Model Cities (PAMC) offices, office procedures in each of the offices follow the same general pattern. That is, intake consists of walk-in traffic, referrals from private agencies (church groups, Salvation Army, etc.), and from public agencies (the local welfare department, the Employment Service, etc.). At intake, applicants complete a Vocational Rehabilitation application. The form is then reviewed for completeness. The applicant is then referred to a counselor who will review the application and any related forms (such as the referral form from the Welfare Department). The counselor will then conduct a screening interview to determine if the applicant qualifies for service and to make an initial determination of the type of service the applicant requires.

To qualify for service, an applicant must generally fall within specified poverty guidelines and have some physical or mental problem which prevents the applicant from competing successfully in the labor market or interferes with his adjustment to society (e.g., drug addiction). In addition, the applicant cannot be receiving or be eligible for service from another agency (such as the Veterans Administration) and must have a problem capable of being successfully resolved.

In the case of the Vocational Rehabilitation agencies associated with Model Cities programs, the applicant must also reside within the Model Cities area. Applicants who do not qualify for service will be referred to whatever community service the Vocational Rehabilitation counselor thinks will help them. Applicants who seem qualified can then be referred to a diagnostician for indicated physical or mental screening. If, based on the diagnostician's report, the applicant is still qualified for service, the applicant will be accepted as a client of the agency. Service to the client can only be terminated if the client successfully completes the plan of service or if the client's circumstances change sufficiently and the client no longer meets the agency's eligibility requirements (e.g., moves to a different area).

Diagnostic services include such services as a dental examination by a dentist, a physical examination by a qualified doctor, a psychiatric examination by a psychiatrist or a psychological examination by a psychologist or a psychiatrist. In addition, the applicant can be referred to other specialists such as an ophthalmologist or audiologist for indicated diagnostic services.

All the offices, with the exception of the Perth Amboy Model Cities (PAMC) office, contract with outside professionals for diagnostic services. PAMC alone has its own extensive vocational evaluation unit and, as such, was considered to be a pilot project of New Jersey Vocational Rehabilitation. PAMC uses portions of the Singer/Graflex Vocational Evaluation System and TOWER Evaluation System test series and also performs the standard ABLE and CALIFORNIA scholastic attainment tests.

All other diagnostic testing, including psychological, is contracted out. Figure 2-1 is an example of the kind of diagnostic report produced by Perth Amboy.

KEY

S = superior
AA = above average
A = average
BA = below average
INF = inferior

Q = quality
T = time

VOCATIONAL EVALUATION REPORT
PERFORMANCE RECORD AND SUMMARY

NAME________________________ CASE NUMBER__________

REFERRED BY________________________

EVALUATOR________________________

ATTENDANCE RECORD

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Month 19____																															
Date Month 19____																															

RATING OF WORK AND PERSONAL CHARACTERISTICS

	S	AA	A	BA	INF
DEXTERITY					
With hands only					
With tools & machinery					
WORK TOLERANCE					
Sitting tolerance					
Standing tolerance					
Frustration tolerance					
WORK HABITS					
Neatness					
Industriousness					
Relationship with supervisors					
Relationship with fellow workers					
Attendance					
Punctuality					

	S	AA	A	BA	INF
COMPREHENSION					
Follows written instructions					
Follows oral instructions					
Retains instructions					
ATTITUDES					
Alertness					
Toward disability					
Self-confidence					
Cooperativeness					
Leadership					
Reaction to work environment					
APPEARANCE					
Personal hygiene					
Grooming					
Appropriateness of dress					

Figure 2-1. Diagnostic Report Form Used by Perth Amboy, N.J. Diagnostic and Employment Center (p. 1 of 4)

	Q	T	COMMENTS
1. BASIC TOOLS			
2. BENCH ASSEMBLY			
3. DRAFTING			
4. ELECTRICAL WIRING			
5. PLUMBING AND PIPEFITTING			
6. CARPENTRY & WOODWORKING			
7. REFRIG., HEATING, AIR CONDITIONING			
8. WELDING AND SOLDERING			
9. CLERICAL			
a. FILING			
b. SALES I			
c. SALES II			
d. TYPING BEGINNING			
e. TYPING ADVANCED			
f. PAYROLL			
g. ADDING MACHINE			
h. RECORD KEEPING			
10. NEEDLE TRADES			
11. MAIL CLERK			
a. OPENING ENVELOPES			
b. SORTING			
c. SEALING			
d. CLASSIFYING			
e. FIGURING POSTAGE			
12. DRAWING			
a. PERSPECTIVE			
b. COLOR SENSE			
c. CREATIVE FORM			
13. ABLE I			
14. CALIFORNIA I			
15. CALIFORNIA II			

Figure 2-1 (continued--p. 2 of 4)

KEY

P = positive
O = neutral
N = negative

SICL RESULTS

		EXP	PREF	COM	COMMENTS
T 1	HARD PHYSICAL LABOR				
2	ERRAND RUNNING				
3	DETAIL WORK - EYE-HAND COORDINATION				
4	TOOLS & MACHINERY - INDEPENDENT				
5	TOOLS & MACHINERY - DEPENDENT				
6	NEATNESS & ORDERLINESS				
7	QUALITY CONTROL & CORRECTION				
8	DRIVING - OPERATING - MOVING				
P 1	POLITENESS - SUPERFICIAL RELATIONSHIP				
2	PHYSICAL SERVICE				
3	MANAGING - LONG TERM RESPONSIBILITY				
4	PERSUADING - SALESMANSHIP				
I 1	SPEAKING - WRITING				
2	WORKING WITH NUMBERS				
3	CLERICAL				
4	INNOVATIVE - CREATIVE				

JOB RECOMMENDATIONS

Figure 2-1 (continued -- p. 3 of 4)

STANDARDIZED TEST RATING

AMPLIFYING COMMENTS ON CHARACTERISTICS AND PERFORMANCE

RECOMMENDATIONS

Signed____________________

Date____________________

Co-signed____________________

Figure 2-1 (continued -- p. 4 of 4)

Diagnostic reports are sent to the counselor handling the case, who will, depending on reported results, take whatever remedial action is required. Such action could range from getting a client extensive orthodontic work to helping find a job. Job development at the Vocational Rehabilitation agencies is usually performed by the counselor handling the case and is usually performed on behalf of individual clients. Vocational Rehabilitation agencies utilize a caseload approach.

2.4 CJMS -- OPERATING EXPERIENCES

The following sections will present descriptions of the agencies' operating experience with the Cleff Job Matching System in the manner of a case study. The reasons for this are manifold: first, there was so much variation in the agencies' experiences with CJMS and the kind of data they retained with respect to CJMS that it is not feasible to create a single standard against which to describe this experience. Secondly, some of the data offered to substantiate claims with respect to CJMS are inconclusive and raise more questions about agency practices not related to CJMS than the data answers with respect to CJMS. And, finally, events occurred in and around the interviewing process which could not be resolved by the interviewer and led the interviewer to question the information received.

As a result of this latter point, the descriptions presented below will be supplemented with a highly subjective description and interpretation of the events which caused the interviewers to question the information received.

2.4.1 The Community Agencies

2.4.1.1 Procedures for the Selection of Persons to Take Self-Interview Checklists (SICL's)

All of the community agencies accepted walk-in applicants and applicants referred to them by other agencies. Intake to the agency (TOPS) primarily concerned with training was weighted more toward applicants referred by other public agencies than was the case in the other two community agencies involved in this study. Three different approaches were taken in deciding to administer the Self-Interview Checklist (SICL).

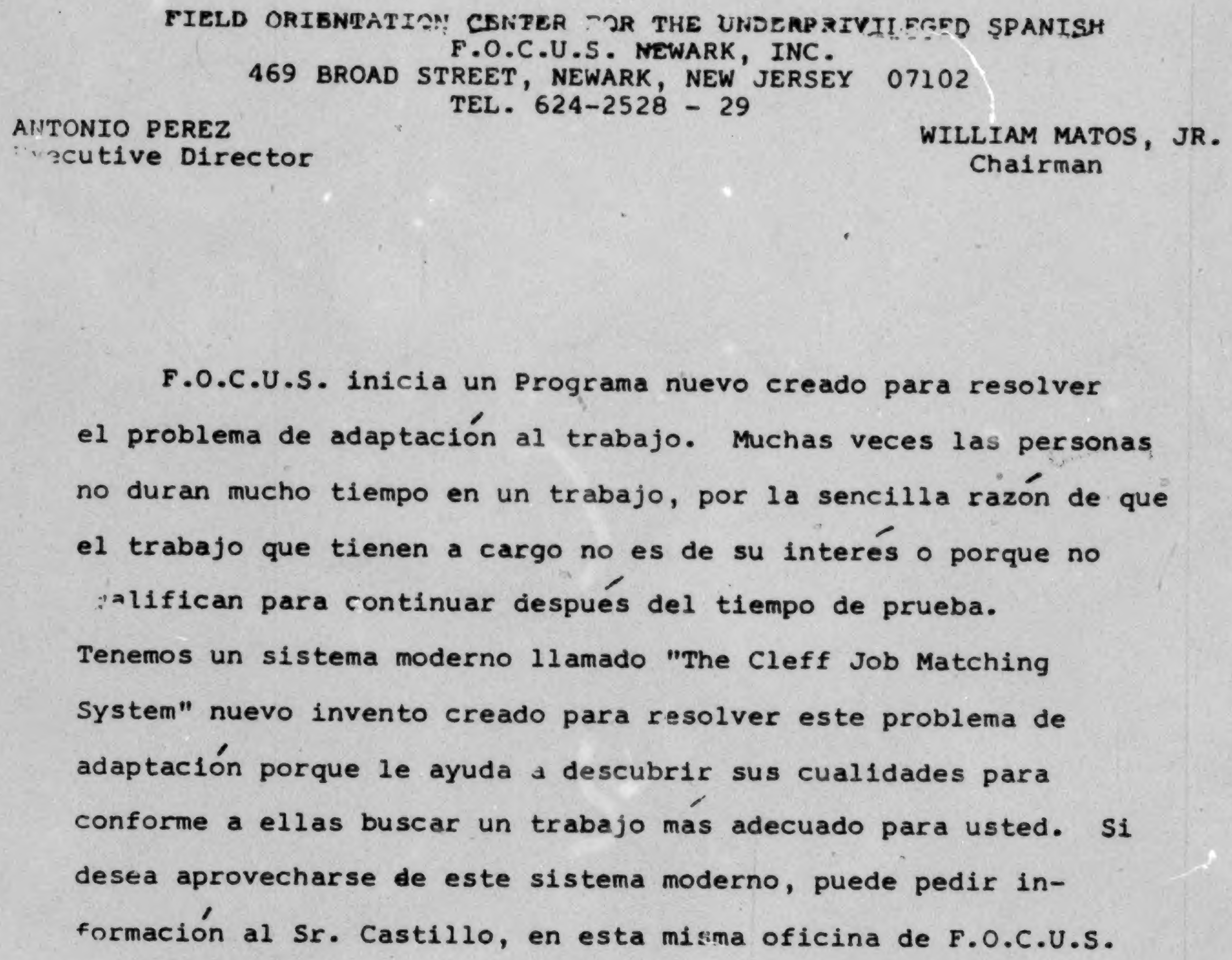
In the agency serving a primarily Spanish-speaking population (FOCUS), applicants are given a handout which informs them that they can avail themselves of the Cleff Job Matching System if they so desire. A copy of this handout appears as Figure 2-2. About 5 to 10 percent of the agency intake volunteered for the SICL. Individuals who speak no English or who have poor command of English were usually discouraged from taking the SICL since it was felt that regardless of the results individuals with language problems could not get most jobs. We were told that most people applying for assistance at the agency were occupationally set and that this worked against their volunteering for the SICL. It was also felt to be bad form to explain how long it took to complete a SICL, since the time factor alone would discourage people from volunteering.

At BICC, the CJMS was made an integral part of their service. Applicants entered, completed applications, and were assigned a counselor. The counselors then engaged the client in interviews to determine the client's service needs and to identify the factors which might support or interfere with the client's attainment of an objective. The client would then be offered the SICL after several such sessions, or as many sessions as the counselor judged necessary to obtain a basic understanding of the client and his needs. The counselors felt that this extended period of counseling was necessary in order to understand the client well enough so that they could allay any possible client fears with respect to entering a "testing" situation, and so that they could adequately answer any questions the client might have during the administration of the SICL.

The remaining community agency, TOPS, which was primarily involved in training, gave a Metropolitan Achievement Test and an SICL to virtually everyone who completed an application. The results of the SICL were then used by the agency as part of their screening procedures to assess who would benefit from the training provided by that institution and to determine course assignments. The agency was obligated to accept individuals referred by such organizations as the CEP and place them in programs specified by the referring agency. Such individuals were also required to take an SICL and, although the results could not be used for normal screening, they used the results to determine the individual's motivation for training and to validate the course assignment. If such an individual, according to the SICL results, was obviously unsuitable for the agency, the agency would contact the referring agency and attempt to have the individual reassigned to different training or have the referral withdrawn.

When asked by Ultrasystems, none of the staff members present remembered a referral withdrawn as a result of the initial determination. However, the staff members did say that these individuals usually dropped out of the training of their own accord.

GIVEN TO CLIENT, WHO DECIDES ON TAKING SICL OR NOT:



FIELD ORIENTATION CENTER FOR THE UNDERPRIVILEGED SPANISH
F.O.C.U.S. NEWARK, INC.
469 BROAD STREET, NEWARK, NEW JERSEY 07102
TEL. 624-2528 - 29

ANTONIO PEREZ
Executive Director

WILLIAM MATOS, JR.
Chairman

F.O.C.U.S. inicia un Programa nuevo creado para resolver el problema de adaptación al trabajo. Muchas veces las personas no duran mucho tiempo en un trabajo, por la sencilla razón de que el trabajo que tienen a cargo no es de su interés o porque no califican para continuar después del tiempo de prueba. Tenemos un sistema moderno llamado "The Cleff Job Matching System" nuevo invento creado para resolver este problema de adaptación porque le ayuda a descubrir sus cualidades para conforme a ellas buscar un trabajo más adecuado para usted. Si desea aprovecharse de este sistema moderno, puede pedir información al Sr. Castillo, en esta misma oficina de F.O.C.U.S.

Figure 2-2. FOCUS Introductory Letter Informing Applicants of the Availability of the Cleff Job Matching System

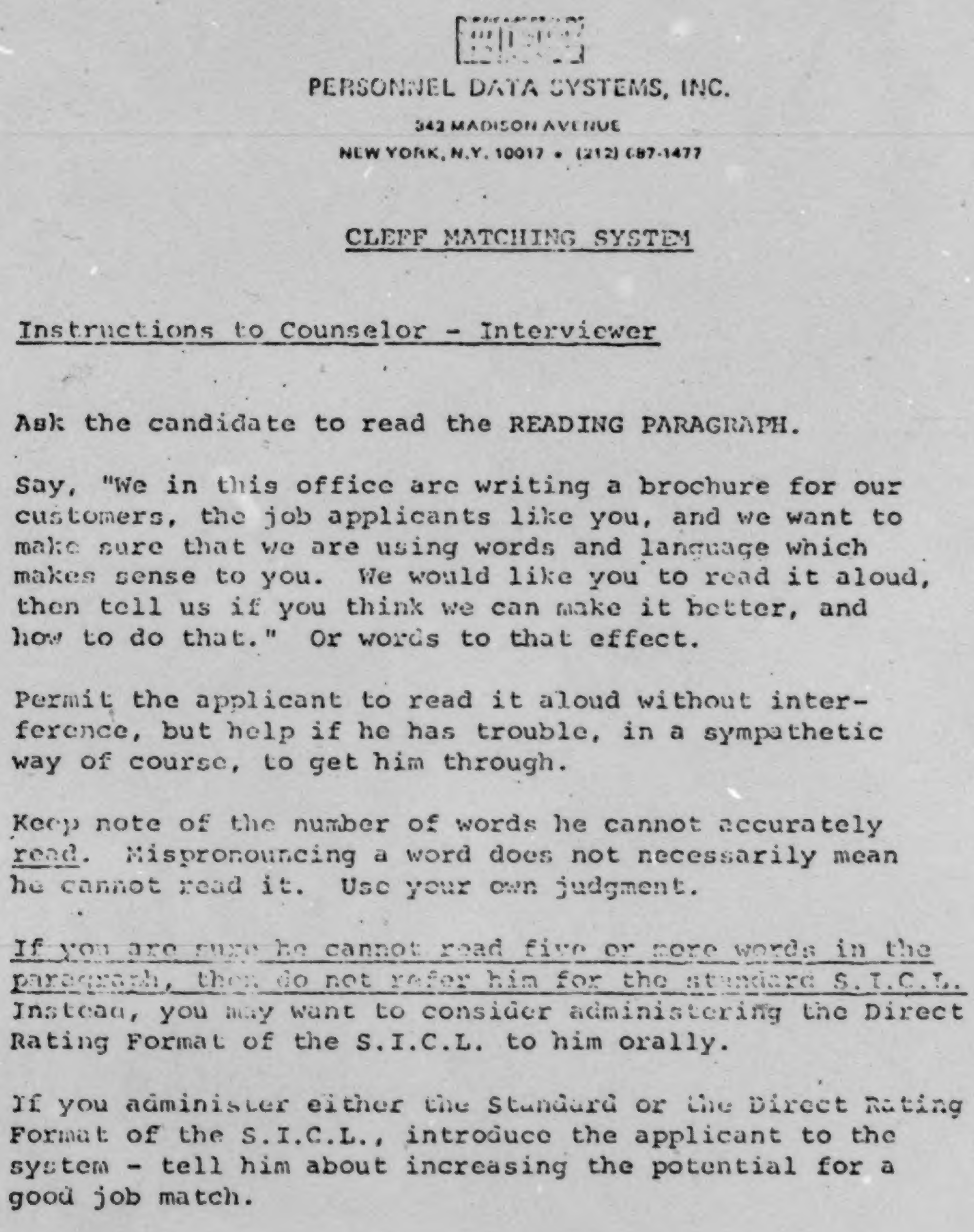
2.4.1.2 SICL Administration

The Self-Interview Checklist imposes very few restrictions on the administrator or respondents and appears to be a highly flexible instrument. The two booklets which comprise the preference and experience interviews of the SICL may be administered as an oral interview or as a written interview in English or Spanish. Ony a portion of the entire SICL need be administered and the administration can be closely or loosely supervised. Whether or not any of these features are used appears to be dependent upon a combination of factors involving the agency's mission, the administrator's personality or training, the level of technical assistance provided, the use to which the results will be put to, and a number of factors involving the respondent.

If the SICL administrator suspects the respondent may be functionally illiterate in English, the respondent is asked to read and explain a reading paragraph which contains many of the terms used in the SICL. Figure 2-3 shows a copy of the administrator's instructions and the reading paragraph. If the respondent is unable to complete this task to the administrator's satisfaction, oral administration is indicated. TOPS will not administer the SICL orally because they feel that a person who is functionally illiterate cannot be successful in their vocational programs. They are consistent in this approach in that they administer the Metropolitan Achievement Test separately to determine the respondent's educational level. TOPS alone of all the agencies has prepared a Spanish language version of the reading paragraph.

Of the three community agencies, only BICC has administered the SICL orally, and this has been on a very limited scale. Oral administration of the SICL requires up to a full day of the respondent's and the administrator's time. The CJMS manual calls this method of administration a "Direct Rating Format." Other than stating that a rating is required for "every activity (16) in every group (15)" for each interview administered, no instructions are supplied on how to administer the SICL orally. Counselors at BICC have tried, on their own, several methods of oral administration but found none of the methods very satisfactory.

The Spanish-speaking clients of TOPS and FOCUS are representative of Cuban, Puerto Rican, and Latin American cultures. There are dialectical differences in each culture and some words do not have similar meanings in all cultures or in formal or informal usage in the same



PERSONNEL DATA SYSTEMS, INC.
342 MADISON AVENUE
NEW YORK, N.Y. 10017 • (212) 687-1477

CLEFF MATCHING SYSTEM

Instructions to Counselor - Interviewer

Ask the candidate to read the READING PARAGRAPH.

Say, "We in this office are writing a brochure for our customers, the job applicants like you, and we want to make sure that we are using words and language which makes sense to you. We would like you to read it aloud, then tell us if you think we can make it better, and how to do that." Or words to that effect.

Permit the applicant to read it aloud without interference, but help if he has trouble, in a sympathetic way of course, to get him through.

Keep note of the number of words he cannot accurately read. Mispronouncing a word does not necessarily mean he cannot read it. Use your own judgment.

If you are sure he cannot read five or more words in the paragraph, then do not refer him for the standard S.I.C.L. Instead, you may want to consider administering the Direct Rating Format of the S.I.C.L. to him orally.

If you administer either the Standard or the Direct Rating Format of the S.I.C.L., introduce the applicant to the system - tell him about increasing the potential for a good job match.

Figure 2-3. CJMS Reading Paragraph--
Interview Instructions

PERSONNEL DATA SYSTEMS, INC.
342 MADISON AVENUE
NEW YORK, N.Y. 10017 (212) 687-1477

READING PARAGRAPH

There are many kinds of people, and many kinds of jobs. Some people operate road graders, paint outside of houses, sell groceries in a store, or repair automobiles. Other people may preach sermons in church, take neighborhood surveys, demonstrate automobile parts for sale, or do research on historical events. And the jobs ask people to do various things; for example, feed children, lay bricks, work with a microscope, interview job candidates, and maybe even do mechanical drawing. There is no telling what a job might demand of a person. We know of a job where the worker was asked to supervise cleaning a building, read complicated instructions, read gauges on machinery, measure food ingredients, and catalogue mail order merchandise. He found the job interesting because he was asked to do so many different things.

Figure 2-3 (continued)

culture. An additional problem arises in that some American English SICL phrases have no meaning in Latin culture and are not strictly translatable into Spanish. These and other problems have resulted in several attempts to develop a Spanish language SICL that is universally usable.

The TOPS counselor stated that the current version was a good translation and that they used the Spanish language SICL. FOCUS preferred not to administer the Spanish language SICL, since they felt it was futile because there were so few jobs that would accept individuals who spoke only Spanish. It was later determined that one of the individuals hired to translate the SICL into Spanish was the TOPS counselor.

At TOPS, the applicant would be scheduled for the SICL immediately, and the written SICL was usually given on a mass basis to about twenty persons at a time. TOPS felt that it required, at a minimum, one administrator or assistant for every ten persons taking the SICL. During one period, they had the use of volunteers from a local college to help monitor the administration of the SICL's. The Metropolitan Achievement Test was administered either before or after the SICL, and staff members said they noticed no differences as a result of this proximity.

The administrative procedure was for the TOPS counselor to explain the method of completing the SICL to the respondents and to satisfy herself that they understood the procedure. The purpose of further monitoring by TOPS staff was to keep order in the room and to be sure the respondents were completing the SICL properly. If a respondent did not understand a phrase on the SICL, it might be explained to him, but usually it was not. TOPS felt that if the respondent did not know, for example, what a bulldozer was, then the respondent did not have any preference (or experience) in that area.

As each booklet was completed, a monitor would check it for completeness and understanding. The booklets would then be mailed to ADP-PDS in New York for scoring. The scores and cluster matches would be received in approximately three to five days from the date the SICL was completed.

On the other hand, a less mechanistic approach to SICL administration was taken by BICC. Groups of up to ten individuals would be scheduled for the SICL. Counselors took turns in giving the SICL's each day so they administered the SICL's to each other's clients. The procedure for taking the SICL would be explained and the respondents requested to complete the first page of the SICL. While this page was being completed, the counselor would spot check individual responses by questioning the respondent about his choices. This type of spot checking would be continued throughout the interview period. Some counselors stated that respondents had difficulty in understanding the four categories of selection (Most, Least, More, Less) used by the SICL. In these cases, they might provide their own interpretations of these categories. For example, Least might be explained as "Pick the phrase you have never done and don't think you will ever do."

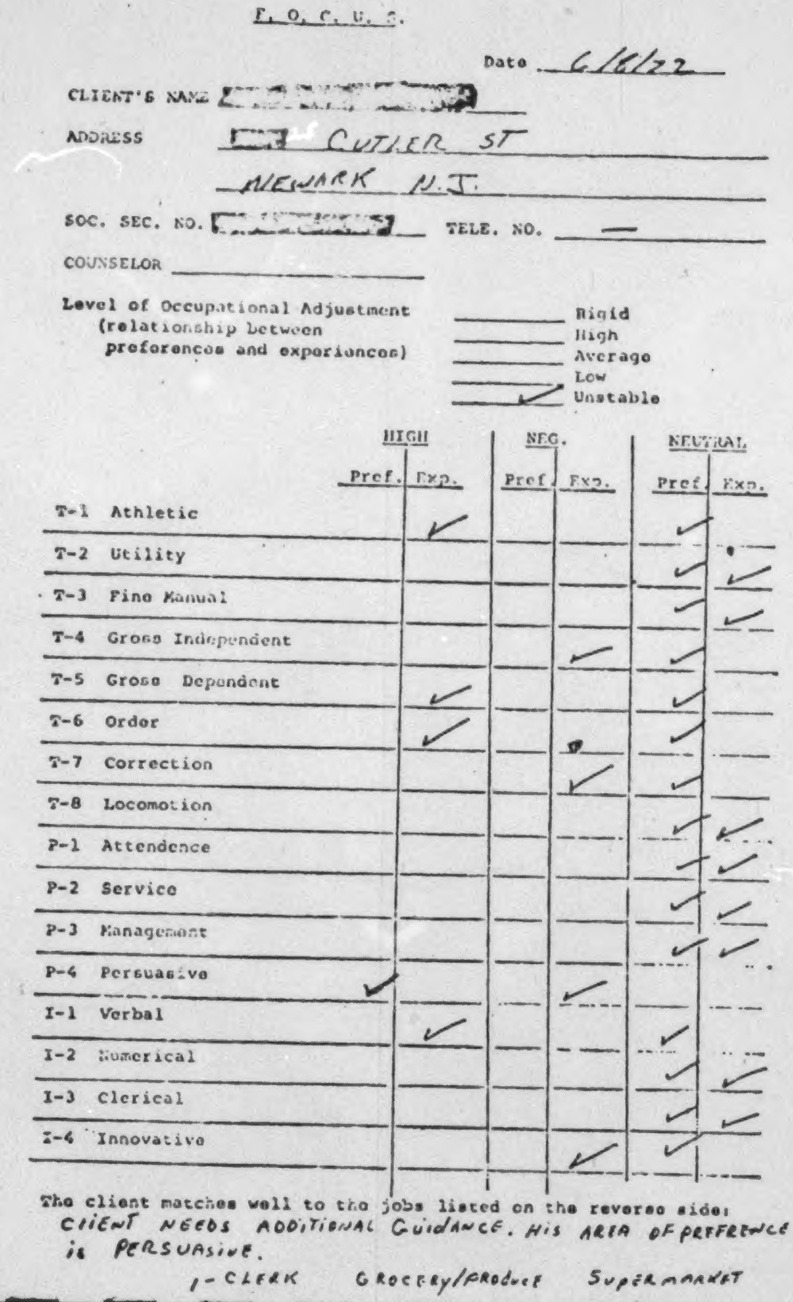
If, after the procedures were understood, the respondent had questions about the meaning of any of the phrases, he could ask the counselor to explain. The counselor, who could determine which Dimension of Work each phrase referred to, would explain or interpret the phrase to the respondent. To BICC counselors, it was considered necessary that the respondent understand as many phrases as possible in order to complete the SICL properly. After the SICL was completed, the raw SICL results could be entered into an on-site computer terminal for processing by time-sharing computer. Turnaround time was minimal and the respondent's SICL results and JOCL and/or Cluster Matches could be received quickly.

2.4.1.3 Results -- Interpretation and Use

The results of the SICL were received in a variety of ways. At FOCUS, the SICL scores were sent to ADP-PDS, who entered the scores into the computer, interpreted the results, and sent the computer results and interpretations to FOCUS. FOCUS reviewed the interpretations and then prepared index cards summarizing the interpretation. Figure 2-4 displays the interpretation form prepared for FOCUS and the index card prepared from that form. Figure 2-5 is a copy of the computer printout from which the interpretation was derived. The name of the respondent has been obscured in both figures to protect his privacy, but both figures refer to the same respondent.

The respondent's scores in Figure 2-5 begin at the top with his Occupational Adjustment Factor (now called Occupational Adjustment Index) The respondent's scores end with the line of numbers beginning: "COM: 3 -2 3 ...." These scores are matched to clusters. Each cluster the respondent has been matched to begins with the title, "Match #xx" and ends with the first line of numbers under the line beginning "$\overline{\text{T1}}$ T2 ...." Note that a cluster is not a job but a type of benchmark score which represents a related set of jobs (related by CJMS).

The numerical scores for the respondent are translated by ADP-PDS to ranges (high, low, and neutral) on the interpretation sheet for



F. O. C. U. S.

Date 6/8/72

CLIENT'S NAME [redacted]

ADDRESS [redacted] CUTLER ST

NEWARK N.J.

SOC. SEC. NO. [redacted] TELE. NO. —

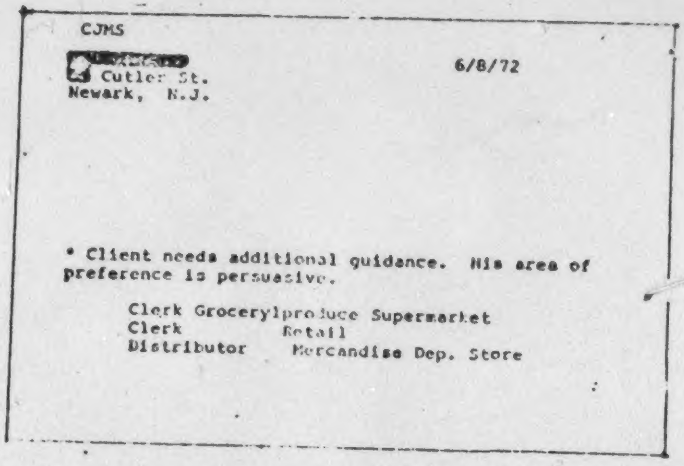
COUNSELOR

Level of Occupational Adjustment (relationship between preferences and experiences)	
	Rigid
	High
	Average
	Low
✓	Unstable

	HIGH		NEG.		NEUTRAL	
	Pref.	Exp.	Pref.	Exp.	Pref.	Exp.
T-1 Athletic		✓			✓	
T-2 Utility					✓	✓
T-3 Fine Manual					✓	✓
T-4 Gross Independent				✓	✓	
T-5 Gross Dependent		✓			✓	
T-6 Order		✓			✓	
T-7 Correction				✓	✓	
T-8 Locomotion					✓	✓
P-1 Attendence					✓	✓
P-2 Service					✓	✓
P-3 Management					✓	✓
P-4 Persuasive	✓			✓		
I-1 Verbal		✓			✓	
I-2 Numerical					✓	✓
I-3 Clerical					✓	✓
I-4 Innovative				✓	✓	

The client matches well to the jobs listed on the reverse side:
CLIENT NEEDS ADDITIONAL GUIDANCE. HIS AREA OF PREFERENCE is PERSUASIVE.

1-CLERK GROCERY/PRODUCE SUPERMARKET



CJMS

[redacted] Cutler St.
Newark, N.J.

6/8/72

* Client needs additional guidance. His area of preference is persuasive.

Clerk	Grocery/produce Supermarket
Clerk	Retail
Distributor	Mercandise Dep. Store

Figure 2-4. CJMS SICL Score Analysis and Index Card Prepared by FOCUS

```
[redacted]   06/08/72
FOCUS GC
6/7/72

  -16  IS OCCUPATIONAL ADJUSTMENT FACTOR
  558  IS DIFFERENCE INDEX
  -69  IS RELATIONSHIP

       T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

EXP:    6  -1   4  -5   8   5  -7   3    -4  -3   3  -8     7   1  -1  -6

PRF:   -1  -2   2  -3  -3   3  -2   0     1   1   1   5     0  -4   1   1

COM:    3  -2   3  -4   3   4  -4   2    -2  -2   2  -2     4  -2   0  -3


IN THE CLUSTER  BANK, THERE ARE:


  19 RECORDS ON FILE
  19 ACTIVE RECORDS


   3 PROFILES ABOVE MINIMUM

HOW MANY DO YOU WANT TO SEE?3


MATCH #   1

NO. 17 CLUSTER                **** CAUTION - USE NEW ****
VOCATIONAL EVALUATION         **** CLUSTER MANUAL    ****
GUIDANCE & TRAINING           **** EDITION 10/06/71  ****

   51  IS MATCH INDEX
  582  IS DIFFERENCE INDEX
  211  IS MATCH RATIO

       T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

       13   9  -7  -4   5  15  -3  -3    -2  -9  -4  -6     4  -2   0  -6

MATCH #   2

NO. 13 CLUSTER                **** CAUTION - USE NEW ****
VOCATIONAL EVALUATION         **** CLUSTER MANUAL    ****
GUIDANCE & TRAINING           **** EDITION 10/06/71  ****

   43  IS MATCH INDEX
  617  IS DIFFERENCE INDEX
  171  IS MATCH RATIO

       T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

        8   3  -1  -3  12   9   7  -2   -10  -1  -8 -11     4   3   0  -9

MATCH #   3

NO. 18 CLUSTER                **** CAUTION - USE NEW ****
VOCATIONAL EVALUATION         **** CLUSTER MANUAL    ****
GUIDANCE & TRAINING           **** EDITION 10/06/71  ****

   41  IS MATCH INDEX
  954  IS DIFFERENCE INDEX
  131  IS MATCH RATIO

       T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

       16   7  -4   6   7  12   2   9    -9 -13  -7  -9    -1  -2  -4 -10
```

Figure 2-5. CJMS--Computer Printout of SICL Scores and Match Indices As Matched to Job Clusters.

each of the CJMS Dimensions of Work. Comments related to this translation are found at the bottom of the interpretation form and a few of the kinds of jobs the respondent might do well are found below that. Note these are not available jobs but suggestions as to the kind of job to develop for the respondent. It appears that the interpretation, especially if only the index card summary is considered, needs a lot of interpretation itself. This limitation appears to be a strength of the system in that it flags possible problems with respect to a person's adaptation to work, gives clues as to why the respondent failed to adapt, but places the burden of finding out why squarely on the shoulders of the counselor.

TOPS receives computer printouts similar to that shown in Figure 2-5. TOPS does its own interpretations and works directly from the computer printouts.

Figure 2-6 shows a copy of the computer printout for BICC. It is similar to the printout shown for FOCUS but differs in one important respect: the matches are to actual jobs and not job clusters. BICC alone of all the agencies using CJMS (including the Vocational Rehabilitation agencies) has developed jobs which have been CJMS-described and has entered these descriptions to the CJMS job bank file.

BICC has a teletype computer terminal. When the SICL's were completed, the teletype operator would punch the scores directly from the SICL booklets and transmit these scores to the on-line CJMS computer. Barring terminal or computer breakdowns, the computer calculates the adjustment and match indices, the dimensions of work scores, and matches these scores to the comparable job-related scores. This data is returned in match order within minutes after it has been entered.

BICC does not purge its CJMS inventory of jobs when the order is filled. Instead, the CJMS job profiles are retained on file and used as a job development source and as a counseling tool. The BICC jobs listed with CJMS are not normally available to other agencies in the system; however, BICC has shared its job openings with FOCUS.

FOCUS does not appear to have made much use of the SICL results. They called in the respondent and went over the results with him. They found most people who took an SICL anxious to find out the results but were unable to make much use of the results. Lack of facility in English and no training stipends limited clients in the training and jobs they would accept or could expect to get. FOCUS felt that the SICL was useful in helping some clients make up their minds for the future but, due to the limited resources available to them (or FOCUS), the SICL was not applicable. Most referrals of clients to jobs were made on the basis of the client's prior experience, not the SICL.

```
3/27/78

   88  IS OCCUPATIONAL ADJUSTMENT FACTOR
  288  IS DIFFERENCE INDEX
  515  IS RELATIONSHIP

        T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

EXP:   -8   1   3  -5  -7  -7  -3  -5    8.-12  -6  -7    10  13  14  10

PRF:  -13  -6   2 -11  -5 -10  -2  -3     4 -10   0   3     7  12  14  13

COM:  -10  -3   2  -8  -6  -9  -3  -4     9 -11  -3  -2     9  12  14  12


IN THE BICCJOBS BANK, THERE ARE:

 189 RECORDS ON FILE
 189 ACTIVE RECORDS

107 PROFILES ABOVE MINIMUM

HOW MANY DO YOU WANT TO SEE?10


 MATCH #   1

 CLERK TYPIST V0008-00021-DOE/DOA MUST TYPE ON ELECTRIC
[redacted]
SEE MRS.MAZZARO/MRS. DEANDREA 45 WPM 6MO-1YR EXP.

   86  IS MATCH INDEX
  451  IS DIFFERENCE INDEX
  406  IS MATCH RATIO

       T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

      -14   6   0 -12 -11  -5  -2 -10     4 -13   1   3    19  11  20   5

 MATCH #   2

ADMITTING CLERK  - V.001   (10-29-71)    E.P.
[redacted]
 SEE MR TURBOWITZ REQ KNOWLEDGE OF MEDICAL TERMINOLOGY TYPE 30 WPM

   84  IS MATCH INDEX
  601  IS DIFFERENCE INDEX
  341  IS MATCH RATIO

       T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

      -16   1   3 -16  -8   3  -2 -13    15  -5  -1 -12    17  11  17  10

 MATCH #   3

 [redacted] NEWARK W00011
[redacted]  1 OPENING CALL FIRST-JR. SECRETARY
SEE HANK HATAU OR JOYCE SCHAYDA  40 HR./WK

   83  IS MATCH INDEX
  718  IS DIFFERENCE INDEX
  310  IS MATCH RATIO

       T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

      -16   2  15 -19  -4  -2  -2 -12    10  -8   3   5    17  17  18   5

 MATCH #   4

 [redacted], NEWARK, N.J. W18-901
[redacted] CALL FOR OPENINGS PROOF MACHINE OPERATOR
SEE MRS. MONOHAN OR MRS. SMITH - VARIED SHIFTS

   82  IS MATCH INDEX
  642  IS DIFFERENCE INDEX
  324  IS MATCH RATIO

       T1  T2  T3  T4  T5  T6  T7  T8    P1  P2  P3  P4    I1  I2  I3  I4

      -16   2   8 -18 -11  -3   1 -17     9  -9  -1   2    14  16  21  -1
```

Figure 2-6. CJMS--Computer Printout of SICL Scores and Match Indices As Matched to Actual Job JOCLs

TOPS was also limited in how they could use the SICL. The SICL results were used along with educational achievement tests to screen persons for the training programs TOPS offered. People who qualified for their service and who indicated clerical or secretarial inclinations in the SICL were accepted for their programs. Others were referred to another agency that might be able to help them. The only exception to this were individuals referred by the CEP. TOPS is obligated to accept all CEP referrals and must generally place these individuals in specified training. TOPS felt they could tell from the SICL whether the person referred by the CEP was motivated sufficiently to complete the training (in addition to being suitable for such training). Although TOPS tried to have the CEP withdraw or change what the SICL indicated was an inappropriate referral, they were unsuccessful. TOPS felt this CEP refusal to change or withdraw the referral was somewhat burdensome, since the individual generally dropped out before completion of training.

Once an individual was accepted for training, TOPS provided counseling services designed to help the client continue in the training and to help the client prepare for a job in the area in which he was being trained. The counselor felt that the SICL results, especially the "People-oriented" parameters, were very useful in counseling at this point. Another benefit cited for CJMS was that it forced TOPS to improve their training. Since CJMS helped TOPS pick the best people, the training standards had to be raised a corresponding amount.

TOPS staff stated that they felt very definitely handicapped without CJMS and, if they had the money, would start using it again.

BICC made the most extensive use of CJMS. They used CJMS as a basis for selecting people for training and jobs. The counselors used SICL results in counseling sessions and felt that the information provided by the SICL considerably shortened the time required for counseling. CJMS was used as a diagnostic tool and was thought to be more useful than the Kuder or Minneapolis. It helped them reduce categorization errors such as occur when a client neglects to tell the interviewer of some significant past experience or when a single DOT code is assigned to an individual with a broad work experience.

In one instance, BICC administered the SICL at nearby Orange High School. The students were not interviewed beforehand and the SICL was administered en masse. BICC stated that the school found the SICL to be accurate and useful for providing the students vocational counseling.

2.4.1.4 Caveats -- Interviews

None of the agencies maintained for themselves statistical data specifically designed to test or evaluate their experience with CJMS. What statistics and information was kept was introduced by ADP-PDS as part of the OEO experiment. Statements made about CJMS by the agencies probably use personal experience as a base of reference and this personal experience seems to weight rather heavily in the agency's evaluation of CJMS.

BICC, for example, was the first of the agencies to use CJMS. They were instrumental in introducing CJMS to OEO and participated in at least two revisions to the system. BICC also appeared to have received the most attention from ADP-PDS in the form of technical assistance. This history could have given BICC almost a proprietary interest in seeing CJMS accepted.

BICC has administered more SICL's than all of the other seven agencies combined, accounting for almost 60 percent of all SICL's in the experimental group. In addition, BICC is the only agency to JOCL jobs and to establish a CJMS job bank. It has placed more people from the experimental group into jobs than any of the other agencies (approximately 42 percent of the total; see Section 3).

FOCUS feels that it has a special problem with Spanish-speaking applicants who do not have a fluency in English. Their attitude seems to be that unless their clients attain fluency in English, they will be restricted to a small set of jobs and that very little can be done until the language barrier is surmounted.

TOPS maintains success statistics, but this data uses as a base individuals accepted into their programs. Furthermore, at the time of this interview, there was only one counselor. This counselor had been hired by ADP-PDS to translate the SICL into Spanish. This latter fact may have influenced her attitude toward the SICL.

2.4.2 The Vocational Rehabilitation Agencies

2.4.2.1 Procedures for the Selection of Persons to Take Self-Interview Checklists (SICL's)

Intake for the Vocational Rehabilitation agencies is primarily a result of referrals from other programs such as the local welfare departments, probation department, and Model Cities agencies.

Applicants complete an application and then see a Vocational Rehabilitation counselor who will assess the individual's eligibility for service and determine what services to offer the client. The counselor may require the client to undergo any of a number of diagnostic services in order to ascertain appropriate remedial services. CJMS was accepted by the agencies in this study as another diagnostic service to add to their repertoire.

The counselor thus could select the CJMS SICL as one of the diagnostic services to offer a client. The SICL could be administered at any time during the client's tenure of service at the counselor's discretion. The counselors are therefore the key to the use of CJMS in the Vocational Rehabilitation offices. In Ultrasystems' opinion, ADP-PDS initially had problems communicating to the Vocational Rehabilitation offices selected to participate in the experiment what the experiment was about and whom it was to serve. About two months after the installation of CJMS, the Vocational Rehabilitation offices held a meeting to clarify these issues, and the New Jersey State Vocational Rehabilitation Director instructed the office managers to use the system. No additional staff was allocated to administer or process the SICL's. This caused objections, since the offices already felt that they were understaffed. ADP-PDS conducted at least three training sessions for the staff of these offices, but failed to convince many of the counselors of the value of the system as compared to other diagnostic services then available. These difficulties, plus related difficulties discussed below, posed a severe handicap to CJMS. The handicap was severe enough in one office (Jersey City) that, except for some experimentation, CJMS was not used.

Another limitation to the use of CJMS in the Vocational Rehabilitation offices lies in how the offices perceive their mission. They are not employment offices and have no full-time job developers. Job development is usually performed by counselors through their own contacts or through referrals to other agencies such as the Employment Service. Individuals entering with medical problems tend to get services designed to alleviate the specific diagnosed complaint. Unless employment requires special considerations on the part of the employer, as with mentally retarded persons, or is considered part of required treatment, as with drug addicts, or is easily attainable, the client is not usually given much help in finding employment. The client in this case will be referred to the Employment Service or returned to the agency which referred him in the first place. Thus, the Atlantic City Model Cities office felt that most of its caseload "were medical problems and not employment problems." After the CJMS experiment ended, ACMC's service load, which excluded drug addicts and juveniles referred by Welfare, was expanded to include these groups, and it was felt that the use of CJMS would increase substantially in order to serve these people.

In addition, offices such as the New Brunswick Vocational Rehabilitation (NBVR) had a large number of clients who were already working but came in for medical services. Although their income was low enough to qualify them for Vocational Rehabilitation services, they were not normally provided employment services because they were already employed. Since they did not require placement help, they did not get an SICL.

Further inhibiting the number of clients that would receive the benefit of CJMS were the problems of administration and the manner in which the results of the SICL were delivered.

2.4.2.2 SICL Administration

The Perth Amboy Model Cities (PAMC) office was especially prepared to administer SICL's. This office is designated as a diagnostic and employment center and is an experimental program of the New Jersey Rehabilitation Commission. It has testing facilities and testing technicians with which it can and does perform several commercially available vocational series. The counselors utilize information from the testing as input for their vocational counseling. None of the other Vocational Rehabilitation offices did their own testing. As previously stated, the usual procedure for other Vocational Rehabilitation agencies was to utilize the services of outside commercial diagnosticians for whatever evaluation the counselors required.

A similar pattern of SICL administration found in the community agencies was found in the Vocational Rehabilitation agencies. That is, some agencies would administer the SICL mechanically providing the respondent with very little help in taking the SICL. Others were careful to insure that the respondent understood every phrase of the SICL. There were no apparent difficulties in administration of the SICL as such.

Problems arose simply because the SICL had to be administered. Someone, usually a counselor, had to take the time to administer the SICL. If the SICL was administered orally, it could take four or more hours. If the SICL was administered in the standard written manner, it required one to two hours of the counselor's time. The counselors stated that they did not like to take this much time from their caseloads to administer a "test." Furthermore, they were not used to administering diagnostic evaluations, since all such evaluations usually were performed by an outside source. This problem was mentioned by all the Vocational Rehabilitation offices except PAMC, which had internal staff specifically designated to administer tests for the agency.

The offices experimented with various ways of alleviating this problem but could not come up with satisfactory results. Atlantic City Vocational Rehabilitation (ACVR) managed to solve this problem when they purchased the CJMS system after the experiment ended. As part of the purchase agreement, ADP-PDS agreed to hire, train, and place on site an individual who could administer the SICL and take care of paperwork and interpretation. The arrangement has been satisfactory for ACVR. The SICL technician administers the SICL for both ACVR and its Model Cities satellite (ACMC). ACVR's second satellite office is about forty miles distant in Cape May, New Jersey.

The two counselors staffing the second satellite office administer the SICL themselves and send the booklets to ACVR for scoring and interpretation. They have experienced no difficulty in administering the SICL, primarily because they have a relatively low caseload (most of their cases are presently employed) and because they only give 10-12 SICL's a month and are able to integrate the SICL's into their schedules.

The Vocational Rehabilitation agencies have experienced some difficulty in getting the respondents to understand the phraseology of the SICL. As in the community agencies, the respondents are functionally literate; i.e., they can pass the reading test. CMVR solves this problem by simplifying phrases. For example, they will change the phrase, "Operate eyelet machine," to "Operate a machine in a factory." Perth Amboy does this too, and it also explains the selection parameters, "Most, Least, More, Less" as "love, hate, like, dislike."

2.4.2.3 Results: Interpretation and Use

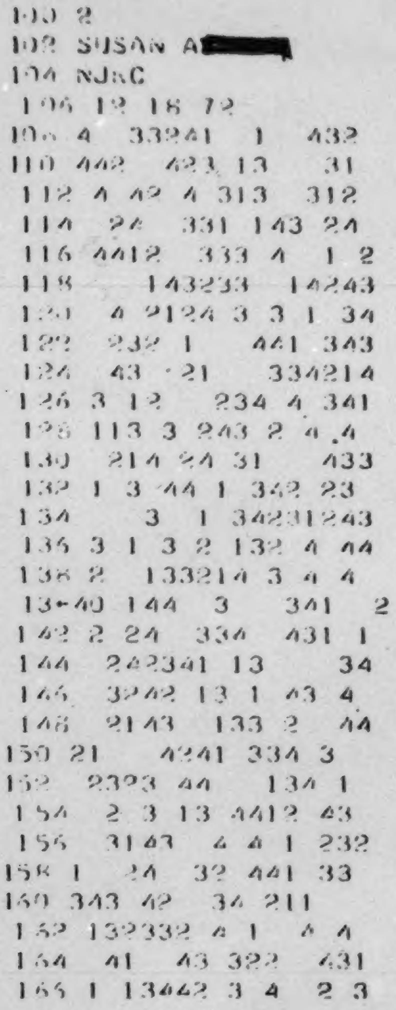
The Vocational Rehabilitation agencies had much more to say about the procedures and technicalities involved with obtaining and using the results than did the community agencies. There are several possible reasons for this. The major reason was the use of outside diagnostic services which could serve as a base against which CJMS could be compared. The following paragraphs divide the comments into three general areas: the procedures involved in scoring the SICL, the interpreting of the SICL scores, and the use of the score results.

2.4.2.3.1 Scoring the SICL

Unlike most commercially available tests, the SICL is clerically complex and difficult to score. For all practical purposes, a computer or similar device is required to score the SICL. Some of the offices (PAMC, ACVR) had a teletype unit installed. The teletype unit could be connected by a telephone hookup to the General Electric Computer Time Sharing System on which CJMS was run. To score an SICL and obtain matches to clusters or JOCL's, the terminal operator would type the SICL responses directly from the SICL booklet. A paper tape would be prepared at the same time. The operator would then dial the computer system on the telephone and insert the telephone receiver into the telephone coupler on the teletype machine when the computer's ready-time was received. The operator would then enter the requisite opening statements, run the previously prepared tape of the SICL, and receive computer calculated SICL scores and matches in return.

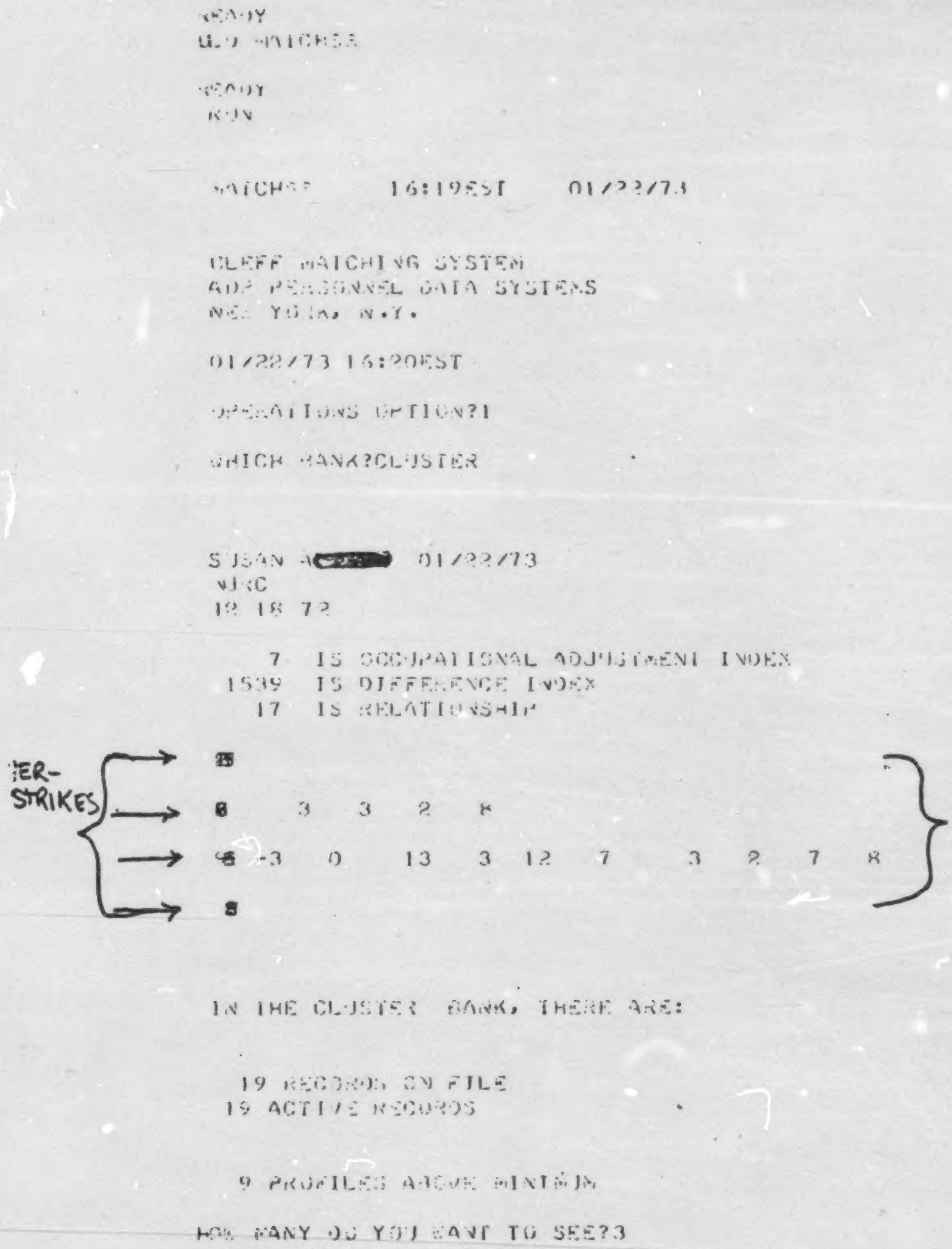
Some offices such as NBVR and JCVR preferred to mail the SICL's to ADP-PDS and have them obtain the scores and matches from the computer. ADP-PDS would then mail the results back to the originating office. While the use of an on-site terminal is an efficient method for scoring and matching, it also provided the greatest source of complaints about the system. Computer breakdowns and terminal breakdowns, although apparently infrequent, were highly visible to offices with terminals. Personnel had to be trained to operate the teletype machines, and, when the offices tried to switch typists, they immediately ran into problems due to the more complex nature of telecommunications as opposed to the relatively simple operation of a typewriter. Adding to these complexities were the problems associated with the equipment in general.

To demonstrate these problems, the teletype operator in Perth Amboy gave us a demonstration. She called the computer three times and hung up the first two, explaining that if the computer's "ready" signal was not loud (e.g., a poor telephone connection), there would be problems later on. She then placed a previously prepared tape into the machine and transmitted the SICL scores as shown in Figure 2-7. Notice the left-hand margin is not even. She then received the messages shown in Figure 2-8. Notice the dark boxes at the left-hand margin. The first boxes should be a line of captions (T1, T2, T3, ... I4); the second box should be a line of experience scores; the third box a line of preference scores; and the fourth box a line of combined scores. The boxes are actually letters and numbers being typed in the same space on the line. The misaligned left margin makes it difficult for the operator to detect typing errors. These are problems caused by a light teletype machine or by a machine requiring adjustment. In the space of one hour, we were not able to get a message free of any overstrikes or clear enough to use. (It was a rainy day, which might account for some of the problems.) Two ways to get readable scores involve requesting re-runs. One method is to keep requesting re-runs until a clear message is received



```
100 2
102 SUSAN A[redacted]
104 NJRC
 106 12 18 72
108 4  33241  1  432
110 442  423 13   31
 112 4 42 4 313  312
 114  24  331 143 24
 116 4412  333 4  1 2
 118     143233  14243
 120  4 2124 3 3 1 34
 122  232 1   441 343
 124  43  21   334214
 126 3 12   234 4 341
 128 113 3 243 2 4 4
 130  214 24 31    433
 132 1 3 44 1 342 23
 134    3  1 34231243
 136 3 1 3 2 132 4 44
 138 2  133214 3 4 4
 13-40 144  3   341  2
 142 2 24  334  431 1
 144  242341 13    34
 146  3242 13 1 43 4
 148  2143  133 2  44
150 21   4241 334 3
152  2323 44   134 1
 154  2 3 13 4412 43
 156  3143  4 4 1 232
158 1  24  32 441 33
160 343 42  34 211
 162 132332 4 1  4 4
 164  41  43 322  431
 166 1 13442 3 4  2 3
```

Figure 2-7. CJMS-SICL Raw Scores Transmitted by Perth Amboy Diagnostic and Employment Center--Teletype Operator's Transmission Copy



```
READY
OLD MATCHES

READY
RUN


MATCHES      16:19EST     01/22/73


CLEFF MATCHING SYSTEM
ADP PERSONNEL DATA SYSTEMS
NEW YORK, N.Y.

01/22/73 16:20EST

OPERATIONS OPTION?1

WHICH BANK?CLUSTER


SUSAN A[redacted] 01/22/73
NJRC
12 18 72

   7  IS OCCUPATIONAL ADJUSTMENT INDEX
1539  IS DIFFERENCE INDEX
  17  IS RELATIONSHIP

8

8    3    3    2    8

8 -3   0    13    3  12   7     3    2    7    8

8


IN THE CLUSTER  BANK, THERE ARE:


 19 RECORDS ON FILE
19 ACTIVE RECORDS


 9 PROFILES ABOVE MINIMUM

HOW MANY DO YOU WANT TO SEE?3
```

Figure 2-8. CJMS-SICL Scores Received As a Result of Transmission Shown in Figure 2-7.

or an intelligible message can be constructed. The second method requires the operator to cause the scores to be received in two modes -- tape and print. In the first method, computer and telephone charges are incurred for every re-run request. In the second method, if the fault is in the printing, the tape can be re-run at a later time without incurring extra telephone or computer charges. Until we started running tapes to determine the cause of the print errors, the teletype operator did not realize that the second method could be used to get clear copy.

Problems associated with the teletype were so severe that the PAMC operator complained that it used a significant amount of her time (she was also assigned other duties). NBVR, which initially had a teletype unit, started mailing SICL's to ADP-PDS for processing. ACVR probably would not have purchased CJMS unless a person was provided who could administer SICL's and operate the teletype.

2.4.2.3.2 Interpreting the SICL

A psychological or psychiatric diagnostic report usually consists of several pages of narrative describing tests given, the test results, results of personal interviews (including some background data which may or may not have been uncovered by the counselor), descriptions of clients' reactions during the examination period, summarizing conclusions, and suggestions for a future course of action. The SICL provides a set of experience, preference, and combination scores, measures of correlations and differences for these scores and, if requested, matches to jobs or clusters with appropriate scores and measures of correlation and difference. A manual is provided by ADP-PDS which defines each of the scores and the measures of correlation and difference and provides informa- on how to use these scores and measures. The clusters accompanying an SICL match suggest a number of jobs the client might do best.

In the psychological or psychiatric narrative, much of the interpretation of tests and correlation of data has been done for the counselor by the examiner and this information is arranged so as to support the examiner's conclusions. Each of the Vocational Rehabilitation offices, except for Perth Amboy, expressed dissatisfaction with the presentation of SICL results.

The senior counselor at the Jersey City VR felt, that compared to the psychological evaluation, CJMS "was a joke. . . . [you] can get all the information that [CJMS] gets from the interview." Both the New Brunswick and Cape May VR offices complained of the time required to interpret the SICL. Each of the offices stated that it required time to learn how to interpret the SICL, experience in the job market in order to be able to relate the clients to the job market, knowledge of the jobs actually available to their clients, and experience with CJMS in order to understand CJMS well enough to use it as a diagnostic tool.

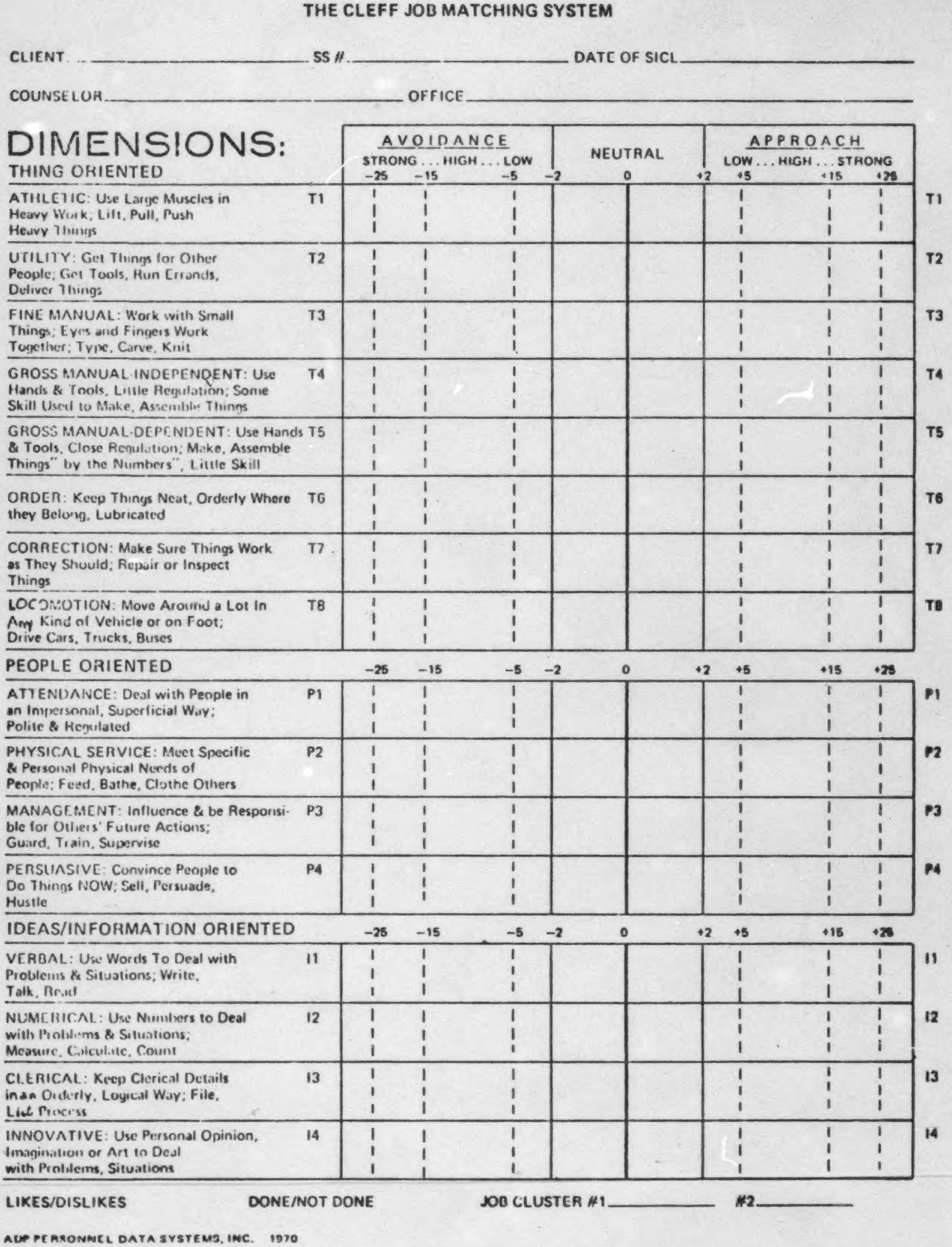
The Jersey City Vocational Rehabilitation (JCVR) office felt that CJMS was inferior to the quality and sophistication obtainable from their consultants. NBVR similarly saw no advantage to using the CJMS because of the expenditure of their own time to administer the SICL, the quality of interpretation, and the time required to obtain results when they mailed the SICL for scoring. JCVR stated that they gave SICL's and psychologicals to two clients and that the psychologicals were "much more revealing and informative."

Atlantic City VR had reduced the problem somewhat by having the ADP-PDS SICL technician chart the results (Figure 2-9 is a sample of the form used to chart the results). The charting is simply a clarification on the presentation of SICL results and counselors still expressed preferences for the psychological narratives.

Perth Amboy MC presented the results of the tests performed by its evaluation section on the score sheet shown in Figure 2-1 which includes the evaluation of the results of all the tests including the SICL. The majority of counselors and evaluators felt insecure in interpreting the SICL's since they don't fully understand the specific meaning of the parameters or statistical base for determining the validity of these parameters. One of the counselors stated that she had done an evaluation of the educational level of the words used in CJMS by a technique developed by Dr. Fry of Rutgers University and had determined that the SICL required a tenth grade reading level, not a sixth grade, as ADP-PDS claimed.

Some counselors questioned how the SICL could be interpreted at all for some clients and gave as examples clients whose point of reference was so low that they had never heard of some phrases. Thus, some clients might actually prefer to "solder wire connections" or "box cans on assembly lines," but, being isolated in their community, have no idea what "soldering" is or what it would be like to work on an assembly line. The counselors agreed that lack of knowledge might indicate lack of interest, but they pointed out that each page of the SICL contained many such phrases. This, coupled with phrases such as "Administer Medicine" (as opposed to, say, "give medicine to sick people"), could result in too many passed phrases on an SICL, which in turn invalidates the results.

One office stated, in reference to CJMS, that they had never seen a test that was not racially or culturally biased. Another office



THE CLEFF JOB MATCHING SYSTEM

CLIENT ____________ SS # ____________ DATE OF SICL ____________

COUNSELOR ____________ OFFICE ____________

	DIMENSIONS:		AVOIDANCE			NEUTRAL			APPROACH			
			STRONG	HIGH	LOW				LOW	HIGH	STRONG	
	THING ORIENTED		−25	−15	−5	−2	0	+2	+5	+15	+25	
T1	ATHLETIC: Use Large Muscles in Heavy Work; Lift, Pull, Push Heavy Things	T1										T1
T2	UTILITY: Get Things for Other People; Get Tools, Run Errands, Deliver Things	T2										T2
T3	FINE MANUAL: Work with Small Things; Eyes and Fingers Work Together; Type, Carve, Knit	T3										T3
T4	GROSS MANUAL-INDEPENDENT: Use Hands & Tools, Little Regulation; Some Skill Used to Make, Assemble Things	T4										T4
T5	GROSS MANUAL-DEPENDENT: Use Hands & Tools, Close Regulation; Make, Assemble Things" by the Numbers", Little Skill	T5										T5
T6	ORDER: Keep Things Neat, Orderly Where they Belong, Lubricated	T6										T6
T7	CORRECTION: Make Sure Things Work as They Should; Repair or Inspect Things	T7										T7
T8	LOCOMOTION: Move Around a Lot In Any Kind of Vehicle or on Foot; Drive Cars, Trucks, Buses	T8										T8
	PEOPLE ORIENTED		−25	−15	−5	−2	0	+2	+5	+15	+25	
P1	ATTENDANCE: Deal with People in an Impersonal, Superficial Way; Polite & Regulated	P1										P1
P2	PHYSICAL SERVICE: Meet Specific & Personal Physical Needs of People; Feed, Bathe, Clothe Others	P2										P2
P3	MANAGEMENT: Influence & be Responsible for Others' Future Actions; Guard, Train, Supervise	P3										P3
P4	PERSUASIVE: Convince People to Do Things NOW; Sell, Persuade, Hustle	P4										P4
	IDEAS/INFORMATION ORIENTED		−25	−15	−5	−2	0	+2	+5	+15	+25	
I1	VERBAL: Use Words To Deal with Problems & Situations; Write, Talk, Read	I1										I1
I2	NUMERICAL: Use Numbers to Deal with Problems & Situations; Measure, Calculate, Count	I2										I2
I3	CLERICAL: Keep Clerical Details in an Orderly, Logical Way; File, List Process	I3										I3
I4	INNOVATIVE: Use Personal Opinion, Imagination or Art to Deal with Problems, Situations	I4										I4

LIKES/DISLIKES DONE/NOT DONE JOB CLUSTER #1 ____________ #2 ____________

ADP PERSONNEL DATA SYSTEMS, INC. 1970

Figure 2-9. CJMS--Form Used to Chart SICL Scores

questioned the validity of the SICL between the English and Spanish versions. They pointed out that translations were not always literal and that the difference between "make pizza" and "hacer pan y galleticas" (literally, "make bread and cookies") could result in significant differences in selections of Spanish-speaking clients--depending on which version they took. With respect to the Spanish language version, PAMC also pointed out the problems associated with dialect or jargon in translation. Thus, a Cuban might understand "cartuchos" to mean cardboard boxes, but a Chilean might think it meant cartridge cases.

2.4.2.3.3 Using the Results of the SICL's

Only the Atlantic City VR offices found any use for the SICL. In PAMC, one of the counselors stated that she used the SICL as it was intended to be used but, given the overall office response, her statement is in question. The other three counselors in the PAMC interviewed stated that they made minimal use of CJMS, and one counselor is quoted as saying, "I've learned to ignore it for at least six months." PAMC evaluators and counselors feel that CJMS may be somewhat useful for inexperienced persons with no idea of direction, but that they would rather spend the time interviewing the client.

New Brunswick VR counselors could not remember CJMS well enough to recall what use they made of the results and JCVR, with less than twenty SICL's administered, did not have sufficient experience with CJMS to make active use of the SICL.

The Atlantic City offices have been able to make extensive use of CJMS, although it appears that the counselors are still probing to determine the limits of the system. Cape May counselors, for example, can interpret the CJMS results but feel they need more experience interpreting in order to be able to derive the maximum amount of information from the results. Nevertheless, they have found that CJMS results provide them with a direction in counseling. This helps them get into effective counseling more rapidly, since it speeds up the fact-finding portion of the counseling period and helps avoid some counseling blind alleys. In addition, the Cape May counselors feel the CJMS results serve as a good tool for determining a need for a psychological or psychiatric examination. Note that the CJMS is not used as a psychological diagnosis but rather as an indicator that such diagnosis may be warranted.

Similarly, ACVR and ACMC counselors feel that CJMS gets them into counseling faster by providing a shortcut to fact finding. These counselors feel CJMS has some advantage over psychological examinations in that it breaks down client/job-related characteristics into more specific areas. This enables them to establish counseling and vocational objectives faster. They find the CJMS especially useful for working with the mentally retarded, since they feel that standard I.Q. tests provide meaningless results, whereas the CJMS helps this client express his interests and vocational strengths.

One counselor stated that she used the SICL as a quick I.Q. test to determine if a client should be sent to college. A psychological test is still conducted since this provides an I.Q. score which must be used to justify the decision for the record. In general, Atlantic City counselors liked the speed with which they could obtain usable results. They could get SICL results back in the same day or within a few days, whereas it could take up to a week before a client could meet with a psychologist and up to three weeks before the psychologist's report could be received.

2.4.2.4 Caveat--Interviewing

The objective of the interviewing was to determine how CJMS was used, what impact it had on staff/client relationships, and to gain insights into how the system could be used and whether these uses appeared to be effective. The purpose was to evaluate the system and not the agencies using the system or the services being supplied the system. These objectives held up in the interviews with the community agencies but collapsed in the Vocational Rehabilitation agencies as it became evident that there were problems external to CJMS that were having deleterious effects on CJMS usage.

It appears, for example, that CJMS was imposed upon the Vocational Rehabilitation agencies in the experiment and that they were virtually ordered to use CJMS by their State Director. We have no direct evidence to support this conclusion other than cautiously worded statements from staff members which seem to imply this. In addition, it appears that some of the personnel responsible for introducing CJMS acted boorishly and tactlessly with Vocational Rehabilitation staff persons and that the manner in which technical assistance was provided only made problems worse.

In one office, for example, the office manager remembered CJMS with sufficient detail to be able to discuss the system. On a second interview visit to that office, the manager was absent and the interviewer attempted to find staff members who would discuss the system. Some staff claimed not to remember the system and others were reluctant to talk about CJMS, giving brief, curt answers in response to interviewer questions. The interviewing in the office finally had to be terminated because of this resistance. One counselor did remember CJMS, but her memories were mainly limited to an ADP-PDS training conference in which the instructor told "dirty jokes" which she took objection to. This conference and reaction was confirmed in another office.

In another office, staff members complained vehemently of the treatment they received from ADP-PDS staff members. They told of 1) brisk responses from ADP-PDS to their questions; 2) calling ADP-PDS offices in New York and not being able to get someone who could answer their questions or of not receiving answers after being told that someone from ADP-PDS would call back with an answer; 3) receiving CJMS materials with what they considered inadequate instructions as to their use and then not being able to obtain clarification in writing or through the personal appearance of a Technical Advisor. Staff members conceded that these experiences possibly had a negative effect on their opinion and ability to use CJMS. In one interviewing experience in this office, the office manager "suggested" that one counselor might be a very good person to interview, and this was a completely positive interview. The counselor responded to questions willingly and knowledgably, but gave the impression to the interviewer that each answer was being carefully thought out. This interview was conducted in the presence of another staff member and was, at least in attitude, completely opposite the interview that had been conducted previously with this staff member. The person then became reticent about answering further questions. The atmosphere for conducting interviews in the rest of the office changed also, and further staff interviews were reduced to giving only direct answers to questions. Until that interview, staff members had spoken openly and freely.

In Atlantic City, staff members spoke freely of CJMS but were reluctant to discuss the personality conflicts other than to acknowledge that they knew of the existence of these problems. The staff did mention difficulties in getting technical assistance with respect to CJMS until they had actually purchased the system at the end of the experiment.

It is believed by Ultrasystems that the conflicts caused by these problems hindered the acceptance and effective use of CJMS by the Vocational Rehabilitation agencies. Why Atlantic City was not affected by these problems is unknown. What the Vocational Rehabilitation agencies' experiences with and attitudes toward the system would have been had these problems not existed is unknown.

2.5 THE JOB OUTLINE CHECKLISTS AND COST DATA

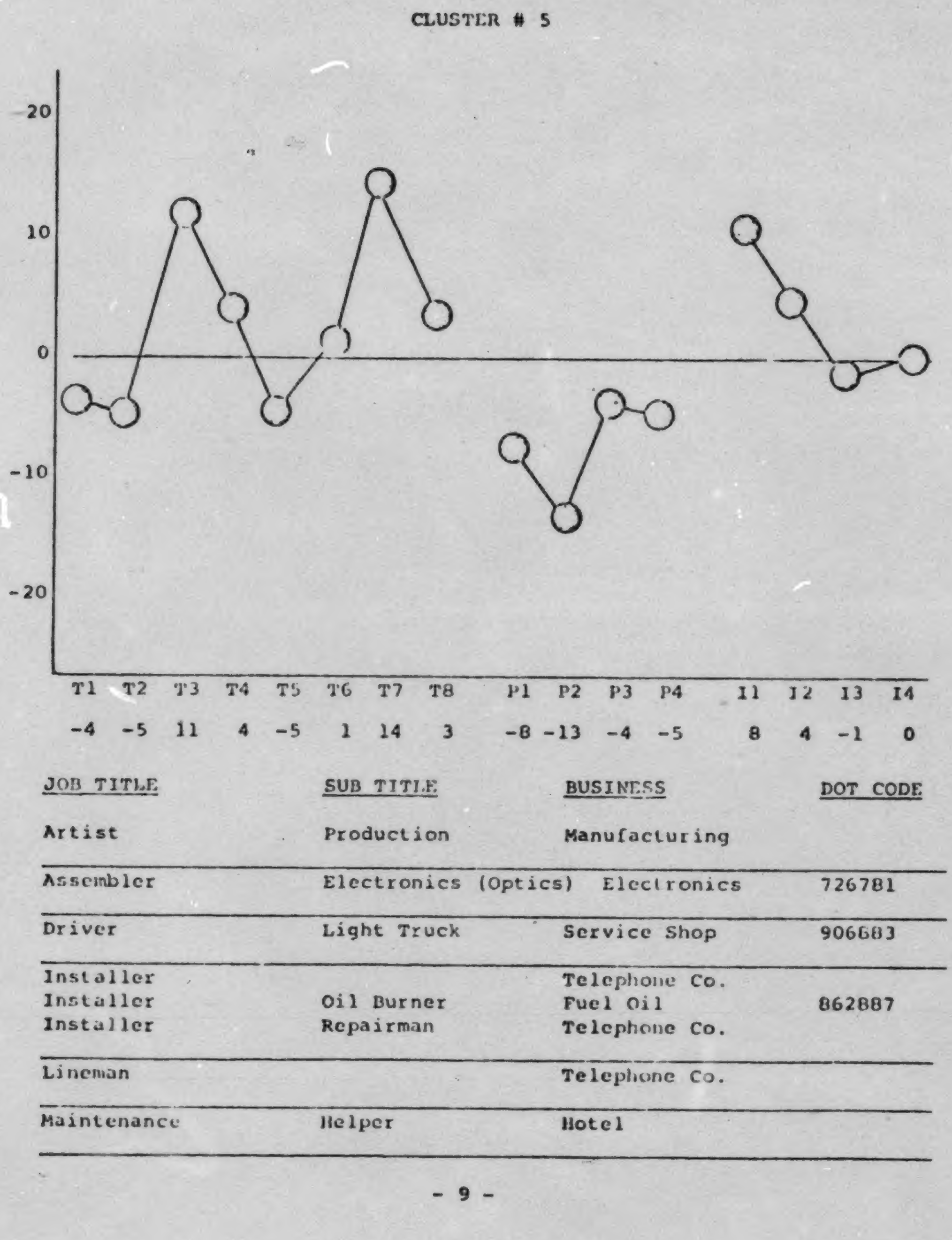
2.5.1 Job Outline Checklists (JOCL's)

None of the community agencies or Vocational Rehabilitation agencies involved in this study had a full-time job development staff. Job development was usually performed by interviewers and counselors as a regular part of their services to clients. BICC alone, of all the agencies involved in this study, prepared Job Outline Checklists (JOCL's) for the jobs they had developed. These JOCL's were entered into the CJMS job bank and SICL's were usually matched against these JOCL's. There were approximately two hundred JOCL's in BICC's job bank at the close of this experiment.

Most of these JOCL's represented jobs with no known immediate openings, but BICC preferred matching client SICL's to these JOCL's as opposed to the CJMS clusters used by all the other agencies. Fiugre 2-10 shows a sample page from the CJMS Job Cluster Register which was used in New Jersey as an aid to selecting appropriate occupations for clients. It was felt that strong SICL/JOCL matches had a good chance of being developed into referrals and hires, even though the job was not known to be immediately available. In addition, there was some question as to the jobs represented by the clusters being directly comparable to the jobs available in the Newark area.

This question as to the applicability of clusters to individual local labor markets was raised by all offices surveyed. The strongest statement to this effect came from a Vocational Rehabilitation agency in which they pointed out that the job clusters were "developed from jobs in the south" and it isn't known if the "behavior on jobs in this area is the same as some other." A study with respect to validating the comparability of cluster jobs to local jobs was identified as being needed.

As an alternative, it was suggested that the clusters be reshaped using JOCL's developed only from local jobs. This agency also stated that it had requested such a study from ADP-PDS and had not received a satisfactory response. Indeed, this appeared to be one of the blind spots for the developers of CJMS. In discussions with them, they mentioned what they regard as problems inherent in the Dictionary of Occupational Titles used by the Employment Service as job definitions that are too broad. However, they could not recognize comparable problems in their own cluster data system. The CJMS developers further insisted that their method of describing jobs in the clusters was adequate, yet Atlantic City counselors expressed a strong desire for additional definition, since they felt the behavioral parameters used by CJMS were an insufficient



CLUSTER # 5

T1	T2	T3	T4	T5	T6	T7	T8	P1	P2	P3	P4	I1	I2	I3	I4
-4	-5	11	4	-5	1	14	3	-8	-13	-4	-5	8	4	-1	0

JOB TITLE	SUB TITLE	BUSINESS	DOT CODE
Artist	Production	Manufacturing	
Assembler	Electronics (Optics)	Electronics	726781
Driver	Light Truck	Service Shop	906683
Installer		Telephone Co.	
Installer	Oil Burner	Fuel Oil	862887
Installer	Repairman	Telephone Co.	
Lineman		Telephone Co.	
Maintenance	Helper	Hotel	

- 9 -

Figure 2-10. CJMS--Sample Page of JOCL Cluster Registers
Used by New Jersey/CJMS Experiment Participants

description of job content. Figure 2-10 shows an example of one page taken from the cluster manual supplied by CJMS. It displays the dimensions of work for that cluster and a graph which provides a visual display of the dimensions. This is followed by a listing of the jobs whose JOCL's are included in that cluster. Each job is identified by a job title, its subtitle, the business the job was found in, and a DOT code. Not every job listed has a DOT code shown for it. According to the CJMS developers, they asked someone from the Employment Service to assign DOT codes to the jobs listed in the clusters and the jobs shown with DOT codes were the only jobs for which there were DOT codes. However, a quick review of the DOT book[1] shows DOT codes of 822.281, 822.381, and 899.887 for Installer, Lineman, and Maintenance Helper, respectively. A single call to the Employment Service provided two possible codes for a Production Artist: 141.081 or 144.081. The former code refers to an "Art Layout Man" who "plans and arranges art layouts using sketches, pictures. . . ." The latter code refers to a "Painter" who "paints landscapes, portraits, still life, abstract designs and similar compositions in oils, watercolor or tempera. . . ." This job title is somewhat obscure, since it can refer not only to the two types of artists shown above, but the latter artist (Painter) could also be working in mass production art, which is a totally different working environment from non-mass produced art.

2.5.2 Costs

BICC counselors felt that use of CJMS resulted in a significant amount of time saved in the counseling process, since it reduced the time required for fact finding and helped the counselor set client service objectives fairly soon in the counseling process. While Atlantic City counselors did not notice a reduction in time required for counseling, some did think that CJMS helped them to set counseling objectives sooner than they might have without CJMS. TOPS counselors could offer no insight on this subject, since, as they explained to us, they "do not think in those terms."

None of the experimental offices was set up to do cost studies with respect to a topic such as presented above. In fact, no cost studies were done. We were told by the CJMS developers that it required approximately 40 minutes for an applicant to complete both booklets of the SICL. Administration times reported by each agency ranged between one and two hours, with one and a half hours being the average for written SICL's. Time required to administer the SICL orally ranged from about four hours in Atlantic City up to a full day at BICC.

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[1] *Dictionary of Occupational Titles*, Third Edition, Manpower Administration, U.S. Department of Labor, 1965.

Upon inquiring about the costs of the system to the agencies in the event of purchase, we were told that ADP-PDS would charge about $8.00 to $10.00 for each SICL administered at BICC. Most of the Vocational Rehabilitation agencies stated that the charge would be $30.00 to $35.00 per SICL administered. Atlantic City said they paid $30.00 per SICL since their purchase of the system. ADP-PDS stated that the charge would be about $8.00 per SICL administered, and we were unable to determine why the Vocational Rehabilitation agencies thought the charge would be higher nor why Atlantic City thought they were paying so much more for the system. The difference might have something to do with the provision of an ADP-PDS employee at the agency to administer the SICL's and to process the results. Obviously, the cost per SICL of such an employee would vary directly with the number of SICL's administered. Ultrasystems was not able to resolve this issue.

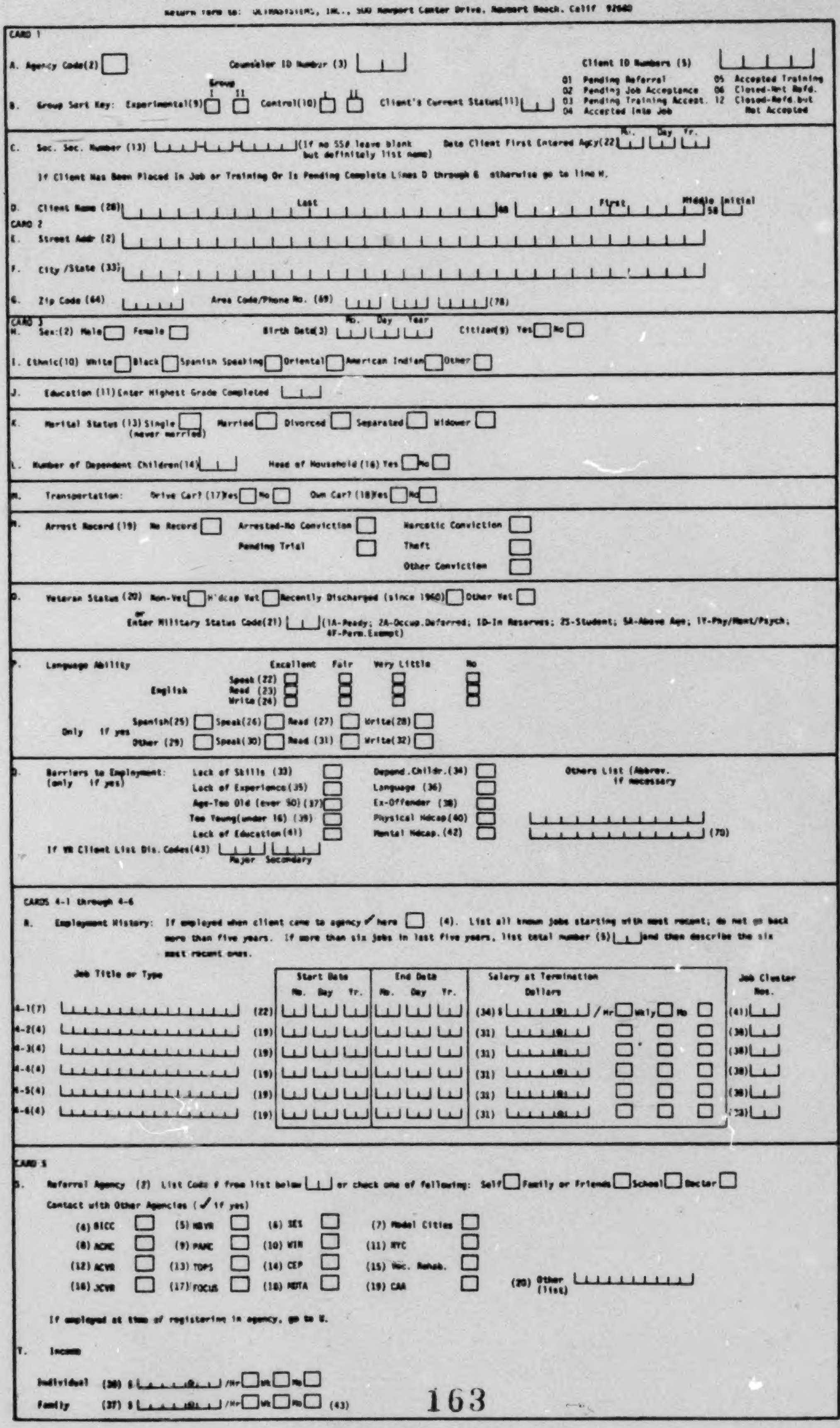
3.0 ANALYSIS OF THE PERFORMANCE DATA OBTAINED FROM THE NEW JERSEY/CLEFF EXPERIMENT

As has been mentioned in earlier sections of this report, the New Jersey/Cleff experiment did not provide sufficient quantitative data for the evaluation of the CJMS as originally designed. This section will present the data that was obtained and the analyses that were completed. The discussion will point out the problems associated with the New Jersey data base. In addition, this section will present a critical review of the final report submitted by ADP-PDS, Inc. regarding the New Jersey experiment and its results. The first subsection that follows will describe the planned and actually implemented data collection activities associated with the evaluation of the New Jersey/Cleff experiment. The next subsection will present the data obtained and analyses performed. This subsection will contain data and analyses associated with determining the socioeconomic characteristics of the control and experimental group clients, the referrals and placements of these client groups, and the post-placement results. The third subsection will draw upon the second in terms of reviewing the ADP-PDS, Inc. final report.

3.1 REVIEW OF THE SCOPE AND METHODOLOGY OF THE DATA COLLECTION

A technical note, submitted by Ultrasystems in August 1972, described in considerable detail the content and format of the data collected during the New Jersey experiment. The technical note proposed a new standardized data collection form to be used to collect the required data from both client groups and for all the agencies. This data collection form is shown in Figure 3-1. The use of this form was agreed to by both OEO and the contractor running the New Jersey experiment, i.e., ADP-PDS, Inc. OEO instructed ADP-PDS, Inc. to use this data collection form to record the data on the experimental and control group clients and to submit these completed forms to Ultrasystems. The data collection using this form began in the fall of 1972 and was completed in March of 1973. The data received on these forms was keypunched by Ultrasystems and a data base for subsequent analysis was generated. This data base was created for use with the Statistical Package for the Social Sciences (hereinafter referred to as SPSS).

Figure 3-2 shows the form of the data base defined for use by SPSS. The data base consists of a set of individual cases, each of which contains the data pertaining to a given client. If one



Return form to: ULTRASYSTEMS, INC., 500 Newport Center Drive, Newport Beach, Calif 92660

CARD 1

A. Agency Code(2) ☐ Counselor ID Number (3) ☐☐ Client ID Numbers (5) ☐☐☐☐☐

B. Group Sort Key: Experimental(9) Group I ☐ II ☐ Control(10) I ☐ II ☐ Client's Current Status(11) ☐☐

01	Pending Referral	05	Accepted Training
02	Pending Job Acceptance	06	Closed-Not Refd.
03	Pending Training Accept.	12	Closed-Refd. but Not Accepted
04	Accepted into Job		

C. Soc. Sec. Number (13) ☐☐☐-☐☐-☐☐☐☐ (If no SS# leave blank but definitely list name) Date Client First Entered Agcy(22) Mo. ☐☐ Day ☐☐ Yr. ☐☐

If Client Has Been Placed In Job or Training Or Is Pending Complete Lines D through G otherwise go to line H.

D. Client Name (28) Last (48) First (58) Middle Initial ☐

CARD 2

E. Street Addr (2)

F. City /State (33)

G. Zip Code (64) Area Code/Phone No. (69) (78)

CARD 3

H. Sex:(2) Male ☐ Female ☐ Birth Date(3) Mo. ☐☐ Day ☐☐ Year ☐☐ Citizen(9) Yes ☐ No ☐

I. Ethnic(10) White ☐ Black ☐ Spanish Speaking ☐ Oriental ☐ American Indian ☐ Other ☐

J. Education (11) Enter Highest Grade Completed ☐☐

K. Marital Status (13) Single (never married) ☐ Married ☐ Divorced ☐ Separated ☐ Widower ☐

L. Number of Dependent Children(14) ☐☐ Head of Household (16) Yes ☐ No ☐

M. Transportation: Drive Car? (17) Yes ☐ No ☐ Own Car? (18) Yes ☐ No ☐

N. Arrest Record (19) No Record ☐ Arrested-No Conviction ☐ Narcotic Conviction ☐
Pending Trial ☐ Theft ☐
Other Conviction ☐

O. Veteran Status (20) Non-Vet ☐ H'dcap Vet ☐ Recently Discharged (since 1960) ☐ Other Vet ☐
or
Enter Military Status Code(21) ☐☐ (1A-Ready; 2A-Occup.Deferred; 1D-In Reserves; 2S-Student; 5A-Above Age; 1Y-Phy/Ment/Psych; 4F-Perm.Exempt)

P. Language Ability

		Excellent	Fair	Very Little	No
English	Speak (22)	☐	☐	☐	☐
	Read (23)	☐	☐	☐	☐
	Write (24)	☐	☐	☐	☐

Only if yes
Spanish(25) ☐ Speak(26) ☐ Read (27) ☐ Write(28) ☐
Other (29) ☐ Speak(30) ☐ Read (31) ☐ Write(32) ☐

Q. Barriers to Employment: (only if yes)

Lack of Skills (33)	☐	Depend.Childr.(34)	☐
Lack of Experience(35)	☐	Language (36)	☐
Age-Too Old (over 50)(37)	☐	Ex-Offender (38)	☐
Too Young(under 16) (39)	☐	Physical Hdcap(40)	☐
Lack of Education(41)	☐	Mental Hdcap.(42)	☐

Others List (Abbrev. if necessary) (70)

If VR Client List Dis. Codes(43) Major ☐☐☐ Secondary ☐☐☐

CARDS 4-1 through 4-6

R. Employment History: If employed when client came to agency ✓ here ☐ (4). List all known jobs starting with most recent; do not go back more than five years. If more than six jobs in last five years, list total number (5) ☐☐ and then describe the six most recent ones.

	Job Title or Type		Start Date Mo.	Day	Yr.	End Date Mo.	Day	Yr.		Salary at Termination Dollars	/Hr	Wkly	Mo		Job Cluster Nos.
4-1(7)		(22)	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐	(34)	$	☐	☐	☐	(41)	☐☐
4-2(4)		(19)	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐	(31)		☐	☐	☐	(38)	☐☐
4-3(4)		(19)	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐	(31)		☐	☐	☐	(38)	☐☐
4-4(4)		(19)	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐	(31)		☐	☐	☐	(38)	☐☐
4-5(4)		(19)	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐	(31)		☐	☐	☐	(38)	☐☐
4-6(4)		(19)	☐☐	☐☐	☐☐	☐☐	☐☐	☐☐	(31)		☐	☐	☐	(38)	☐☐

CARD 5

S. Referral Agency (2) List Code # from list below ☐☐ or check one of following: Self ☐ Family or Friends ☐ School ☐ Doctor ☐

Contact with Other Agencies (✓ if yes)

(4) BICC	☐	(5) NBVR	☐	(6) SES	☐	(7) Model Cities	☐
(8) ACMC	☐	(9) PAMC	☐	(10) WIN	☐	(11) NYC	☐
(12) ACVR	☐	(13) TOPS	☐	(14) CEP	☐	(15) Voc. Rehab.	☐
(16) JCVR	☐	(17) FOCUS	☐	(18) MDTA	☐	(19) CAA	☐

(20) Other (list)

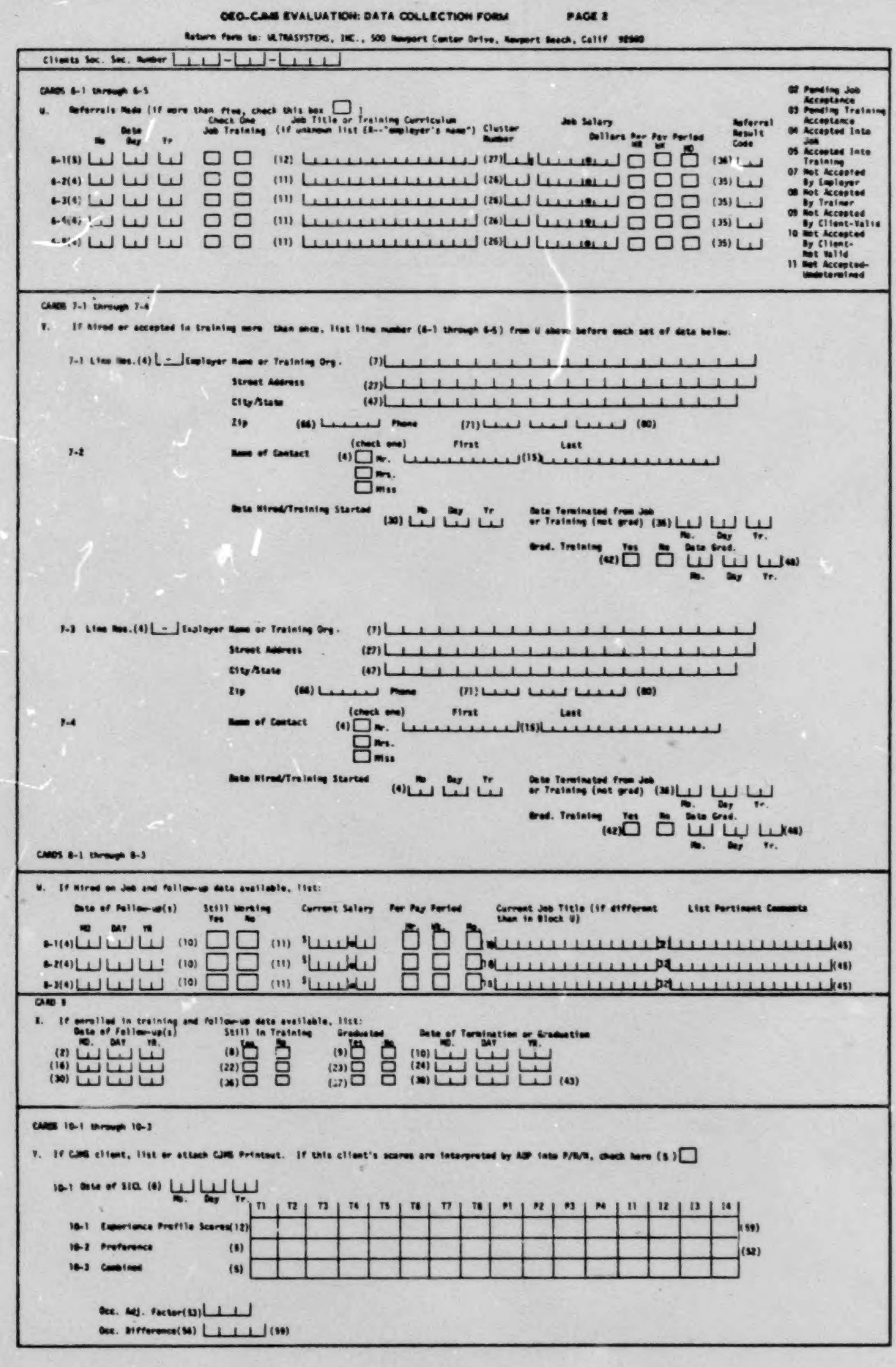
If employed at time of registering in agency, go to U.

T. Income

Individual (36) $ /Hr ☐ Wk ☐ Mo ☐
Family (37) $ /Hr ☐ Wk ☐ Mo ☐ (43)

Numbers enclosed in parentheses on this form are for keypunching use only.

Figure 3-1. Data Collection Form



OEO-CJMS EVALUATION: DATA COLLECTION FORM PAGE 2

Return form to: ULTRASYSTEMS, INC., 500 Newport Center Drive, Newport Beach, Calif 92660

Clients Soc. Sec. Number ___-__-____

CARDS 6-1 through 6-5

U. Referrals Made (If more than five, check this box ☐)

	Date Mo	Date Day	Date Yr	Check One Job	Check One Training		Job Title or Training Curriculum (If unknown list ER--"employer's name")		Cluster Number	Job Salary Dollars	Per HR	Pay WK	Period MO		Referral Result Code
6-1(5)	__	__	__	☐	☐	(12)	________________	(27)	__	____.__	☐	☐	☐	(36)	__
6-2(4)	__	__	__	☐	☐	(11)	________________	(26)	__	____.__	☐	☐	☐	(35)	__
6-3(4)	__	__	__	☐	☐	(11)	________________	(26)	__	____.__	☐	☐	☐	(35)	__
6-4(4)	__	__	__	☐	☐	(11)	________________	(26)	__	____.__	☐	☐	☐	(35)	__
6-5(4)	__	__	__	☐	☐	(11)	________________	(26)	__	____.__	☐	☐	☐	(35)	__

02 Pending Job Acceptance
03 Pending Training Acceptance
04 Accepted Into Job
05 Accepted Into Training
07 Not Accepted By Employer
08 Not Accepted By Trainer
09 Not Accepted By Client-Valid
10 Not Accepted By Client-Not Valid
11 Not Accepted-Undetermined

CARDS 7-1 through 7-4

V. If hired or accepted in training more than once, list line number (6-1 through 6-5) from U above before each set of data below:

7-1 Line Nos.(4) _-_ Employer Name or Training Org. (7)____________________
Street Address (27)____________________
City/State (47)____________________
Zip (66)_____ Phone (71)___ ___ ____ (80)

7-2 Name of Contact (check one) (4) ☐ Mr. ☐ Mrs. ☐ Miss First ____________ (15) Last ______________
Date Hired/Training Started (30) Mo __ Day __ Yr __
Date Terminated from Job or Training (not grad) (36) __ Mo. __ Day __ Yr.
Grad. Training (42) ☐ Yes ☐ No Date Grad. __ Mo. __ Day __ Yr. (48)

7-3 Line Nos.(4) _-_ Employer Name or Training Org. (7)____________________
Street Address (27)____________________
City/State (47)____________________
Zip (66)_____ Phone (71)___ ___ ____ (80)

7-4 Name of Contact (check one) (4) ☐ Mr. ☐ Mrs. ☐ Miss First ____________ (16) Last ______________
Date Hired/Training Started (4) Mo __ Day __ Yr __
Date Terminated from Job or Training (not grad) (36) __ Mo. __ Day __ Yr.
Grad. Training (42) ☐ Yes ☐ No Date Grad. __ Mo. __ Day __ Yr. (48)

CARDS 8-1 through 8-3

W. If Hired on Job and follow-up data available, list:

	Date of Follow-up(s) MO	DAY	YR		Still Working Yes	No		Current Salary	Per Pay Period Hr.	Wk.	Mo.		Current Job Title (If different than in Block U)		List Pertinent Comments	
8-1(4)	__	__	__	(10)	☐	☐	(11)	$____.__	☐	☐	☐	18	______________	32	______________	(45)
8-2(4)	__	__	__	(10)	☐	☐	(11)	$____.__	☐	☐	☐	18	______________	32	______________	(45)
8-3(4)	__	__	__	(10)	☐	☐	(11)	$____.__	☐	☐	☐	18	______________	32	______________	(45)

CARD 9

X. If enrolled in training and follow-up data available, list:

	Date of Follow-up(s) MO.	DAY	YR.		Still in Training Yes	No		Graduated Yes	No		Date of Termination or Graduation MO.	DAY	YR.	
(2)	__	__	__	(8)	☐	☐	(9)	☐	☐	(10)	__	__	__	
(16)	__	__	__	(22)	☐	☐	(23)	☐	☐	(24)	__	__	__	
(30)	__	__	__	(36)	☐	☐	(37)	☐	☐	(38)	__	__	__	(43)

CARDS 10-1 through 10-3

Y. If CJMS client, list or attach CJMS Printout. If this client's scores are interpreted by ASP into P/N/N, check here (5) ☐

10-1 Date of SICL (6) __ Mo. __ Day __ Yr.

		T1	T2	T3	T4	T5	T6	T7	T8	P1	P2	P3	P4	I1	I2	I3	I4	
10-1 Experience Profile Scores	(12)																	(59)
10-2 Preference	(5)																	(52)
10-3 Combined	(5)																	

Occ. Adj. Factor(53) ___
Occ. Difference(56) ____ (59)

Figure 3-1. (Cont.)

```
CLEFF.DATA BANK FOR STUDY OF CLEFF
VAR001 TO VAR170
VAR001.AGENCY CODE/
VAR002.COUNSELOR ID/
VAR003.CLIENT ID/
VAR004.GROUP NO/
VAR005.CLIENT STATUS/
VAR006.SOCIAL SECURITY/
VAR007.DATE ENTERED/
VAR008.SEX/
VAR009.BIRTH DATE/
VAR010.CITIZEN/
VAR011.ETHNIC/
VAR012.HIGHEST GRADE/
VAR013.MARITAL STATUS/
VAR014.DEPENDENTS/
VAR015.HEAD OF HOUSE/
VAR016.DRIVE CAR/
VAR017.OWN CAR/
VAR018.ARREST RECORD/
VAR019.VET STATUS/
VAR020.MILITARY STATUS/
VAR021.SPEAK ENGLISH/
VAR022.READ ENGLISH/
VAR023.WRITE ENGLISH/
VAR024.SPANISH/
VAR025.SPEAK SPANISH/
VAR026.READ SPANISH/
VAR027.WRITE SPANISH/
VAR028.OTHER LANGUAGE/
VAR029.SPEAK OTHER LANGUAGE/
VAR030.READ OTHER LANGUAGE/
VAR031.WRITE OTHER LANGUAGE/
VAR032.BARRIERS-LACK OF SKILLS/
VAR033.BARRIERS-DEP. CHILD/
VAR034.BARRIERS-LACK OF EXPERIENCE/
VAR035.BARRIERS-LANGUAGE/
VAR036.BARRIERS-AGE-TOO OLD/
VAR037.BARRIERS-EX-OFFENDER/
VAR038.BARRIERS-TOO YOUNG/
VAR039.BARRIERS-PHYSICAL HANDICAP/
VAR040.BARRIERS-LACK OF EDUCATION/
VAR041.BARRIERS-MENTAL HANDICAP/

VAR042.DISABILITY CODE-MAJOR/
VAR043.DISABILITY CODE-SECONDARY/
VAR044.CURRENTLY EMPLOYED/
VAR045.MORE THAN 6 JOBS/
VAR046.EMP-START DATE-1/
VAR047.EMP-END DATE-1/
VAR048.EMP-SALARY-1/
VAR049.EMP-JOB CLUSTER-1/
VAR050.EMP-START DATE-2/
VAR051.EMP-END DATE-2/
VAR052.EMP-SALARY-2/
VAR053.EMP-JOB CLUSTER-2/
VAR054.EMP-START DATE-3/
VAR055.EMP-END DATE-3/
VAR056.EMP-SALARY-3/
VAR057.EMP-JOB CLUSTER-3/
VAR058.EMP-START DATE-4/
VAR059.EMP-END DATE-4/
VAR060.EMP-SALARY-4/
VAR061.EMP-JOB CLUSTER-4/
VAR062.REFERRAL AGENCY/
VAR063.BICC/
VAR064.NHVR/
VAR065.SFS/
VAR066.MODEL CITIES/
VAR067.ACMC/
VAR068.PAMC/
VAR069.WIN/
VAR070.NYC/
VAR071.ACVR/
VAR072.TOPS/
VAR073.CEP/
VAR074.VOC. REHAB./
VAR075.JCVR/
VAR076.FOCUS/
VAR077.MOTA/
VAR078.CAA/
VAR079.OTHER AGENCY CONTACT/
VAR080.GREATER THAN 5 REFERRALS/
VAR081.REFERRAL-DATE-1/
VAR082.REFERRAL-JOB TRAIN-1/
VAR083.REFERRAL-CLUSTER NO-1/
VAR084.REFERRAL-SALARY-1/
VAR085.REFERRAL-RESULT-1/
VAR086.REFERRAL-DATE HIRED-1/

VAR087.REFERRAL-DATE TERMINATED-1/
VAR088.REFERRAL-GRAD. TRAIN-1/
VAR089.REFERRAL-DATE GRAD.-1/
VAR090.REFERRAL-DATE-2/
VAR091.REFERRAL-JOB TRAIN-2/
VAR092.REFERRAL-CLUSTER NO-2/
VAR093.REFERRAL-SALARY-2/
VAR094.REFERRAL-RESULT-2/
VAR095.REFERRAL-DATE HIRED-2/
VAR096.REFERRAL-DATE TERM-2/
VAR097.REFERRAL-GRAD TRAIN-2/
VAR098.REFERRAL-DATE GRAD-2/
VAR099.REFERRAL-DATE-3/
VAR100.REFERRAL-JOB TRAIN-3/
VAR101.REFERRAL-CLUSTER NO-3/
VAR102.REFERRAL-SALARY-3/
VAR103.REFERRAL-RESULT-3/
VAR104.REFERRAL-DATE HIRED-3/
VAR105.REFERRAL-DATE TERM-3/
VAR106.REFERRAL-GRAD TRAIN-3/
VAR107.REFERRAL-DATE GRAD-3/
VAR108.REFERRAL-DATE-4/
VAR109.REFERRAL-JOB TRAIN-4/
VAR110.REFERRAL-CLUSTER NO-4/
VAR111.REFERRAL-SALARY-4/
VAR112.REFERRAL-RESULT-4/
VAR113.REFERRAL-DATE HIRED-4/
VAR114.REFERRAL-DATE TERM-4/
VAR115.REFERRAL-GRAD TRAIN-4/
VAR116.REFERRAL-DATE GRAD-4/
VAR117.HIRE FOLLOWUP-DATE-1/
VAR118.HIRE STILL WORKING-1/
VAR119.HIRE CURRENT SALARY-1/
VAR120.HIRE DATE-2/
VAR121.HIRE STILL WORKING-2/
VAR122.HIRE CURRENT SALARY-2/
VAR123.HIRE DATE-3/
VAR124.HIRE STILL WORKING-3/
VAR125.HIRE CURRENT SALARY-3/
VAR126.TRAINING FOLLOWUP-DATE-1/
VAR127.TRAINING STILL TRAINING-1/
VAR128.TRAINING GRADUATED-1/
VAR129.TRAINING GRAD DATE-1/
VAR130.TRAINING DATE-2/
VAR131.TRAINING STILL TRAINING-2/
VAR132.TRAINING GRADUATED-2/
VAR133.TRAINING GRAD DATE-2/
VAR134.TRAINING DATE-3/

VAR135.TRAINING STILL TRAINING-3/
VAR136.TRAINING GRADUATED-3/
VAR137.TRAINING GRAD DATE-3/
VAR138.INTERPRETED BY ADP/
VAR139.SICL DATE/
VAR140.SCORE-1/
VAR141.SCORE-2/
VAR142.SCORE-3/
VAR143.SCORE-4/
VAR144.SCORE-5/
VAR145.SCORE-6/
VAR146.SCORE-7/
VAR147.SCORE-8/
VAR148.SCORE-9/
VAR149.SCORE-10/
VAR150.SCORE-11/
VAR151.SCORE-12/
VAR152.SCORE-13/
VAR153.SCORE-14/
VAR154.SCORE-15/
VAR155.SCORE-16/
VAR156.OCC ADJ FACTOR/
VAR157.OCC DIFFERENCE/
VAR158.INDIVIDUAL SALARY/
VAR159.FAMILY SALARY/
VAR160.JOB TITLE-1/
VAR161.EMPLOYER NAME-1/
VAR162.JOB TITLE-2/
VAR163.EMPLOYER NAME-2/
VAR164.JOB TITLE-3/
VAR165.EMPLOYER NAME-3/
VAR166.JOB TITLE-4/
VAR167.EMPLOYER ANEM-4/
VAR168.CURRENT JOB-1/
VAR169.CURRENT JOB-2/
VAR170.CURRENT JOB-3
```

Figure 3-2. SPSS Data Base Definition For Analysis Of New Jersey/ Cleff Experiment Data.

examines either the data collection form or the data SPSS data base definition, one sees the following:[1]

1) Each client is identified by an assigned client identification number and is also identified as to the agency with which the client was associated: the counselor in charge of this client's case file and the experimental or control group in which this client is included. The client's latest status is also defined. There are seven status codes defined as follows:

   a) Pending Referral
   b) Pending Job Acceptance
   c) Pending Training Acceptance
   d) Accepted Into Job
   e) Accepted Training
   f) Closed--Not Referred to Job or Training
   g) Closed--Referred to Job or Training But Not Accepted

   In addition, the date when the client first entered the agency is provided.

   This data is recorded on lines A, B, and C.

2) Each client is further identified by the client's social security number and if the client has been placed (accepted) into a job or training or is pending same, then the client's name, address, and phone number are provided. Clients who had been placed (or because they were in pending status could be placed) were to be interviewed. Therefore this data was required.

   This data is recorded on lines C through G.

3) The socioeconomic characteristics of each client are provided. These data elements are essentially the standard ones utilized in manpower evaluations. Because of the presence of Spanish-speaking and of vocational rehabilitation clients in the data base, the data items listed in P and Q were included. In Q, the Vocational Rehabilitation Disability Codes are to be input. The client's individual and family income at the time the client first entered the agency are given in item T.

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[1] The line designations used refer to the data collection form shown in Figure 3-1.

4) The client's work history is briefly provided in item R. Please note that in addition to the standard data items space is provided for the inclusion of the Cleff Job Cluster register number that best represents each of the client's previous jobs. This item is input based on the past job descriptions provided in the client's case files. It is thus a judgmental entry.

5) The source of the client as viewed by the agency with which this client was associated during the experiment is identified in item S. In addition, item S provides data about the client's association with other agencies (if any), including the other agencies participating in the experiment.

This completes page 1 of the data collection form. As can be seen from the above descriptions, the data on page 1 is almost completely concerned with the client's characteristics and has no substantial data regarding the services and the outcomes of these services provided by the agency. In addition, page 1 contains no data related to the client's CJMS scores. Page 2 of the data collection is devoted exclusively to these data items. In particular, page 2 is devoted to obtaining the data that describes the referral services, their outcomes, and the CJMS scores as follows:

1) The referrals to either jobs or training programs are described in item U. A cluster number is assigned based on the job description. This cluster number is taken from the Cleff Cluster Register and is assigned based on the cluster register's list of jobs. If the job or training program to which the client has been referred has been profiled using the JOCL instrument, then the number assigned to this JOCL is included in the Job Title space. The JOCLs completed during the experiment were to be supplied Ultrasystems so that the correspondence could be made.

   The referral result is listed according to the codes listed on the form.

2) If the client has been placed, then the employer or training organization is identified in block V. This data was needed for the interviews to be done. The date of hire and the date terminated or graduated (if applicable) is also to be entered.

3) Follow-up data, if available, is entered in items W and X.

4) The client's SICL dimension scores and the client's occupational adjustment (factor) and difference indices are entered in block Y.

The data obtained via this data collection form was to be supplemented through interviews with clients placed into jobs and/or training programs and with their on-the-job supervisor. This data would provide the definitive data on retention and would also provide measures of job satisfaction, job performance, and job advancement. As has been discussed earlier in this report, these interviews were never conducted. Thus, the data provided Ultrasystems via the data collection instruments described above represents the only quantitative data available to Ultrasystems regarding the New Jersey/Cleff experiment.

3.2 ANALYSIS OF THE PERFORMANCE DATA OBTAINED

Ultrasystems received data collection forms on 2619 experimental group clients and 1170 control group clients. These data collection forms were received from all the agencies participating in the New Jersey experiment with the exception of the Jersey City Vocational Rehabilitation office. In the technical note submitted by Ultrasystems in August 1972, it was pointed out that this particular Vocational Rehabilitation office had administered SICLs to only 18 clients through July 31, 1972. This particular office had essentially decided not to participate in the experiment.

Ultrasystems proposed and OEO agreed to drop this agency from the experiment at least as far as obtaining data is concerned. The agency was visited and staff interviews were conducted. The results of these have been reported in the previous section.

Table 3-1 shows the number of experimental and control group clients for which data collection forms were received. This table shows the number of such clients per agency and per the groups into which they were assigned. The experimental design called for three time-phased experimental groups and three time-phased control groups. The experimental design specified that the three experimental groups would each number approximately one-third of the total experimental clients to be processed, i.e., 3500 clients or 1167 per group. The first and third control groups would consist of 200 clients each, and the middle or second group would consist of 400 clients. Based on the analysis documented in the technical note submitted in August 1972, Ultrasystems recommended that the control group size be increased from the original 800. The intent was to try and equalize the sizes of the experimental and control groups for each agency except BICC and TOPS. The reasons why these two agency control groups were not included in this recommendation were as follows:

TABLE 3-1. NUMBER OF CLIENTS IN EACH EXPERIMENTAL AND CONTROL GROUP FROM EACH AGENCY; PER DATA RECEIVED

Agency		Experimental				Control					
Name	Number	EI	E2	E3	Total	C1	C2	C3	Total	Special C5	Total Control
BICC	1	847	370	344	1561	99	196		295		295
Atlantic City	MC 2	55	26	58	139	15	11		26		26
Atlantic City	VR 3	134	27	22	183	15	30	229	274	22	296
Jersey City	VR 4	NO DATA AVAILABLE--DROPPED FROM DATA ANALYSIS									
New Brunswick	VR 5	111	8	6	125			33	33	93	126
Perth Amboy	VR/MC 6	130	66	37	233	38	20	125	183	42	225
TOPS	7	137		146	283	107			107		107
FOCUS	8		90	5	95		73		73	22	95
Totals		1414	587	618	2619	274	330	387	991	179	1170

1) The control group for BICC is composed of clients served not by BICC but by the Urban League of Newark/Essex County. Aside from the fact that Ultrasystems considered this a serious departure from the research design, it was decided that since the already established control group was quite large it would be sufficient. In addition, the amount of effort required to generate a control group of equal size for BICC's experimental group was considered excessive and, in fact, was probably not attainable.

2) There were no other clients available from the TOPS agency for inclusion in a control group.

The data in Table 3-1 shows the following:

1) The New Jersey experiment did not achieve its original objective of 3500 clients for whom the CJMS would be used.

2) The experiment did not achieve its original objective of having three equal-sized experimental groups.

3) The original experimental design called for having the experimental group composed of approximately equal numbers of clients from each of three agency groups, i.e., BICC, Model Cities, and Vocational Rehabilitation. Therefore, BICC clients were to account for one-third of the experimental group total. In the end, BICC accounted for 59.6% of the total experimental group. The relationship between the other six offices/agencies and the two other groups is not and has never been clear. The two Atlantic City agencies (agencies #2 and #3) and the New Brunswick (#5) and Perth Amboy (#6) agencies are all staffed entirely or in part by employees of the New Jersey Rehabilitation Commission. Therefore, these agencies are, in terms of staff, associated with Vocational Rehabilitation. The Atlantic City VR office (agency #3) and the New Brunswick VR office (agency #5) are standard VR offices applying the standard VR criteria for the acceptance of clients. These offices appear, therefore, to fit directly into the VR category. The other two agencies (#2 and #6) did not (based on field visits) appear to apply the standard VR criteria for client acceptance and were located in Model Cities neighborhoods. Hence, they would fit into the Model Cities group. For the two other agencies, TOPS and FOCUS, it is not definitely known if they are located in Model Cities neighborhoods. They are not Vocational Rehabilitation offices. Therefore, if one were to force them into a group, one would have to put them into the Model Cities group or into a new group. In the final analysis, it doesn't really matter.

(Note: In the ADP-PDS, Inc. final report to be discussed in the next section, the data about BICC, TOPS, and FOCUS were presented uniquely. The Perth Amboy and Atlantic City Model Cities (agencies #2 and #6) data were grouped under the heading Model Cities. The data from the Atlantic City VR and New Brunswick VR offices (agencies 3 and 5) were grouped under the heading VR).

It is clear, however, that the experiment did not comply with its original design regarding the number of clients to be processed by the three agency groupings.

4) In the description of the experiment that accompanied the RFP for the evaluation, it was stated that each of the three time-phased experimental groups "will consist of every agency applicant meeting both agency criteria and CJMS criteria for placement consideration until one-third of the particular agency quota has been met (see Appendix D). Ultrasystems has never seen any document that sets forth these agency quotas. In addition the experimental and control groups were to be time-phased. The key here was that the CJMS would be used and not used over distinct time periods. When the CJMS was not in use, the applicants meeting each agency's criteria for placement consideration and being accepted by the agency as a client would be included in the control groups. The experimental design never, to Ultrasystems' knowledge, addressed the relationship between agency quotas and the timing of the groups. In addition, it never apparently addressed the issue of the comparative experimental and control group demographic similarity in terms of the decision regarding inclusion of clients into the control groups. Some of the issues involved here are:

   a) If each experimental phase began at the same time for each agency, then it is conceivable, and in all probability likely, that each agency would reach its quota at different points in time. If this happened, would one wait until all the agencies meet their quotas (or were close) before one started including clients in the control group? Then, as with the experimental group, one could conceivably have the control group quotas met at different times.

   b) One could have begun the experiment at the same time but have each agency transition between experimental and control groups when they meet their quotas. This would yield a continuity to each agency's use and non-use but could lead to differences in the absolute times at which each agency was in one of the two operating modes.

c) One could have a priori determined chronological time points for the use and non-use of the CJMS by all the agencies. This could result in agencies exceeding or not reaching their quotas, but it would have yielded distinct time phases in which the system was used or not used. In addition, there would be continuity over time.

d) The description of the experiment referred to earlier (see Appendix D) indicated that when the experiment was in the control group phase (CJMS was "turned off"), all the clients accepted by each agency (meeting the agency criteria and the CJMS criteria for placement consideration) would be included in the control group. The description also used the phrase "time dependent control groups." Thus, it seems that the experimental design was calling for distinct time periods during which the CJMS would be used and not used and that all clients meeting a set criteria that came to each agency during the time periods would end up in the appropriate group. The concept of quotas might be more related to the choice of the time spans based on estimates of agency volumes and need not be rigidly adhered to during the course of the experiment.

In the final analysis, the experiment did not proceed according to these design concepts. One agency, BICC, used the CJMS essentially all the time for all its clients. This agency's control group was comprised of clients served by another agency. The TOPS agency used the CJMS for all the clients it was screening for acceptance into its training programs. The control group for TOPS consisted of clients accepted into training prior to the experiment. TOPS does not operate with a continuous intake process, but rather screens applicants for acceptance into its training at distinct time points. Some of its applicants are screened, but are automatically accepted because of arrangements with other agencies who refer clients to them. All the other agencies or offices used the CJMS essentially continuously, but did not use it for all clients over any time period. The control groups for these agencies were obtained by some sort of random case file selection process. The experiment, therefore, did not operate in distinct on-off time periods and did not include all clients over some time periods who met some criteria into either the experimental or control groups. In all fairness to the contractor running the experiment, it should be noted that little, if any, control was exercisable over the agency's operations during the experiment. In Ultrasystems' opinion, it would not be reasonable or even desirable to have such control exercisable by an outside contractor over an agency's operations. For all practical purposes, the original design was probably unrealistic.

Because of these aspects, the data to be presented treats the experimental and control groups as distinct entities with no breakouts given in terms of time-phased groups. The data about the experimental and control groups are, however, discussed in terms of their agency association.

3.2.1 Demographic Characteristics of the Experimental and Control Group Clients

Tables 3-2 through 3-8 present the demographic characteristics of the experimental and control group clients from each agency. The tables are all in the same format.

Examining Table 3-2, as an example, one sees that the demographic data is shown separately for the total experimental and total control group clients for the agency. Each demographic data item is shown in terms of the observed frequency with which it was reported. The frequency counts for each data item do not contain counts of missing or unreported data. Thus many of the frequency counts shown do not add to the total number of clients reported in each group from each agency (see Table 3-1). The percent of the observed frequency for each data item is also shown. The chi-square statistic comparing the frequency count between the experimental and control group for each attribute data item is also shown along with a symbol notation that indicates the significance of the chi-square statistic. The symbol notation is interpreted as follows:

-	Not significant at lowest confidence level at which tests were made (i.e., 95%)
+	Significant at 95% confidence level
++	Significant at 99% confidence level
+++	Significant at 99.9% confidence level

The variable "highest grade" is shown at the bottom of the table. This was treated as a continuous variable and the t-test was used to compare the means of the two client groups. The symbol notation given above is the same.

The statistical measures are read in terms of the null hypothesis; i.e., that the relative frequencies of the demographic characteristic (attribute) shown are the same between the experimental (CJMS) and control groups. Hence the presence of one or more + symbols indicates that the null hypothesis does not hold at the symbol-indicated level of confidence.

TABLE 3-2. ANALYSIS OF DEMOGRAPHIC DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

AGENCY #1 -- BICC

ATTRIBUTE CHARACTERISTICS	EXPERIMENTAL GROUP		CONTROL GROUP			
	OBSERVED FREQUENCY	(%)	OBSERVED FREQUENCY	(%)	X^2	SIG
Sex (% male)	426/1559	27.3	110/295	37.3	11.50	+++
Ethnic						
White	72/1408	5.1	43/258	16.7	43.51	+++
Black	1266/1408	89.9	209/258	81.0	16.18	+++
Spanish	54/1408	3.8	6/258	2.3	1.03	-
Criminal Record	137/1550	8.8	No Data	-	-	
Speak English	1421/1430	99.4	36/36	100.0	0.36	-
Read English	1417/1430	99.1	35/35	100.0	0.12	-
Write English	1409/1430	98.5	39/39	100.0	0.01	-
Citizenship	1304/1354	96.3	57/57	100.0	1.24	-
Drive Car	619/1552	39.9	83/220	37.7	0.29	-
Own Car	325/1548	21.0	55/209	26.3	2.77	-
Barriers to Employment						
Lack of Skills	2/1561	0.1	1/295	0.3	0.00	-
Dependent Children	112/1561	7.2	1/295	0.3	19.10	+++
Lack of Experience	123/1561	7.9	5/295	1.7	13.83	+++
Language	7/1561	0.4	0/295	0	0.40	-
Too Old	32/1561	2.0	1/295	0.3	3.24	-
Ex-Offender	69/1561	4.4	0/295	0	12.34	+++
Physical Handicap	8/1561	0.5	0/295	0	0.56	-
Lack of Education	543/1561	34.8	33/295	11.2	63.46	+++
Mental Handicap	3/1561	0.2	0/295	0	0.001	-

VARIABLE CHARACTERISTICS	EXPERIMENTAL GROUP				CONTROL GROUP				
	$\overline{X}$	s	n		$\overline{X}$	s	n	t	SIG
Highest Grade	11.64	1.94	1553		12.32	1.97	289	5.45	+++

TABLE 3-3. ANALYSIS OF DEMOGRAPHIC DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

AGENCY **#2 Atlantic City Model Cities**

ATTRIBUTE CHARACTERISTICS	EXPERIMENTAL GROUP OBSERVED FREQUENCY	(%)	CONTROL GROUP OBSERVED FREQUENCY	(%)	X^2	SIG
Sex (% male)	74/139	53.2	15/26	57.7	0.04	-
Ethnic						
White	54/138	38.8	9/26	34.6	0.04	-
Black	83/138	59.7	17/26	65.4	0.08	-
Spanish	1/138	0.7	0/26	0.0	0.88	-
Criminal Record	30/136	22.1	5/26	19.2	0.02	-
Speak English	128/132	97.0	25/25	100.0	0.04	-
Read English	128/132	97.0	25/25	100.0	0.04	-
Write English	128/132	97.0	25/25	100.0	0.04	-
Citizenship	112/112	100.0	26/26	100.0	0.00	-
Drive Car	13/104	12.5	9/25	36.0	5.75	+
Own Car	9/104	8.7	2/25	8.0	0.09	
Barriers to Employment						
Lack of Skills	0/139	0.0	0/26	0.0	0.00	-
Dependent Children	0/139	0.0	0/26	0.0	0.00	-
Lack of Experience	7/139	5.0	0/26	0.0	0.41	-
Language	0/139	0.0	0/26	0.0	0.00	-
Too Old	7/139	5.0	0/26	0.0	0.41	-
Ex-Offender	7/139	5.0	1/26	3.8	0.06	-
Physical Handicap	8/139	5.8	0/26	0.0	0.57	-
Lack of Education	85/139	61.2	11/26	42.3	2.47	-
Mental Handicap	16/139	11.5	0/26	0.0	2.13	-

VARIABLE CHARACTERISTICS	EXPERIMENTAL GROUP $\overline{X}$	s	n		CONTROL GROUP $\overline{X}$	s	n	t	SIG
Highest Grade	10.00	2.53	135		10.00	2.49	23	0	-

TABLE 3-4. ANALYSIS OF DEMOGRAPHIC DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

Vocational
AGENCY #3Atlantic City-Rehabilitation

ATTRIBUTE CHARACTERISTICS	EXPERIMENTAL GROUP OBSERVED FREQUENCY	(%)	CONTROL GROUP OBSERVED FREQUENCY	(%)	x^2	SIG
Sex (% male)	119/183	65.0	150/283	53.0	6.10.	+
Ethnic						
White	112/176	63.6	76/121	62.8	0.001	-
Black	56/176	31.8	40/121	33.1	0.010	-
Spanish	2/176	1.1	5/121	4.1	1.65	-
Criminal Record	55/178	30.9	22/288	7.7	44.48	+++
Speak English	180/180	100	289/289	100	0.00	-
Read English	179/179	100	289/289	100	0.00	-
Write English	179/179	100	289/289	100	0.00	-
Citizenship	179/179	100	271/282	96.1	5.58	+
Drive Car	11/177	6.2	43/272	15.8	8.44	++
Own Car	9/177	5.1	22/268	8.2	1.16	-
Barriers to Employment						
Lack of Skills	1/183	.5	104/296	35.1	77.04	+++
Dependent Children	0/183	0	0/296	0	0.00	-
Lack of Experience	2/183	1.1	27/296	9.1	11.44	+++
Language	0/183	0	0/296	0	0.00	-
Too Old	6/183	3.3	10/296	3.4	0.04	-
Ex-Offender	2/183	1.1	9/296	3.0	1.14	-
Physical Handicap	20/183	10.9	127/296	42.9	53.87	+++
Lack of Education	88/183	48.1	167/296	56.4	2.83	-
Mental Handicap	36/183	19.7	63/294	21.4	0.12	-

VARIABLE CHARACTERISTICS	EXPERIMENTAL GROUP				CONTROL GROUP				
	$\overline{X}$	s	n		$\overline{X}$	s	n	t	SIG
Highest Grade	10.03	2.50	165		10.01	2.66	277	0.08	-

TABLE 3-5. ANALYSIS OF DEMOGRAPHIC DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

AGENCY #5 - New Brunswick-Vocational Rehabilitation

ATTRIBUTE CHARACTERISTICS	EXPERIMENTAL GROUP OBSERVED FREQUENCY	(%)	CONTROL GROUP OBSERVED FREQUENCY	(%)	X^2	SIG
Sex (% male)	61/124	50.8	82/123	66.7	7.03	++
Ethnic						
White	50/119	42.0	27/40	67.5	6.80	++
Black	67/119	56.3	10/40	25.0	10.53	++
Spanish	2/119	1.7	3/40	7.5	1.69	-
Criminal Record	21/115	18.2	11/43	25.6	0.63	-
Speak English	77/77	100	38/38	100	0.00	-
Read English	77/77	100	37/38	97.4	0.13	-
Write English	77/77	100	37/38	97.4	0.13	-
Citizenship	53/53	100	12/12	100	0.00	-
Drive Car	71/117	60.7	15/39	38.5	4.98	+
Own Car	43/117	36.8	7/34	20.6	2.42	-
Barriers to Employment						
Lack of Skills	1/125	0.8	0/126	0.0	0.00	
Dependent Children	4/125	3.2	5/126	4.0	0.00	-
Lack of Experience	6/125	4.8	8/126	6.3	0.07	-
Language	0/125	0.0	1/126	0.8	0.00	-
Too Old	9/125	7.2	18/126	14.3	2.59	-
Ex-Offender	4/125	3.2	11/126	8.7	2.50	-
Physical Handicap	36/125	28.8	1/126	0.8	36.96	+++
Lack of Education	68/125	54.4	55/126	43.7	2.49	-
Mental Handicap	6/125	4.8	23/126	18.3	9.84	++

VARIABLE CHARACTERISTICS	EXPERIMENTAL GROUP $\overline{X}$	s	n	CONTROL GROUP $\overline{X}$	s	n	t	SIG
Highest Grade	10.55	2.37	125	10.21	2.86	119	1.01	-

TABLE 3-6. ANALYSIS OF DEMOGRAPHIC DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

AGENCY #6 Perth Amboy Model Cities

ATTRIBUTE CHARACTERISTICS	EXPERIMENTAL GROUP OBSERVED FREQUENCY	(%)	CONTROL GROUP OBSERVED FREQUENCY	(%)	x^2	SIG
Sex (% male)	157/233	67.4	137/223	61.4	1.51	-
Ethnic						
White	46/232	19.8	33/209	15.8	.96	-
Black	30/232	12.9	21/209	10.0	.63	-
Spanish	155/232	66.8	153/209	73.2	1.84	-
Criminal Record	29/173	16.8	19/72	26.4	2.41	-
Speak English	120/188	63.8	114/166	68.7	.72	-
Read English	109/181	60.3	92/157	58.6	.04	-
Write English	105/179	58.6	89/158	56.3	.10	-
Citizenship	125/142	88.0	72/96	75.0	5.93	+
Drive Car	75/211	35.5	26/54	48.1	2.39	-
Own Car	42/216	19.4	8/40	20.0	.02	-
Barriers to Employment						
Lack of Skills	11/233	4.7	1/225	0.4	6.61	+
Dependent Children	2/233	0.9	10/225	4.4	4.45	
Lack of Experience	8/233	3.4	12/225	5.3	.59	-
Language	49/233	21.0	33/225	14.7	18.50	+++
Too Old	11/233	4.7	15/225	6.7	.49	-
Ex-Offender	16/233	6.9	18/225	8.0	.08	-
Physical Handicap	48/233	20.6	78/225	34.7	10.66	++
Lack of Education	141/233	60.5	170/225	75.6	11.20	+++
Mental Handicap	14/233	6.0	4/225	1.8	4.36	+

	EXPERIMENTAL GROUP			CONTROL GROUP				
VARIABLE CHARACTERISTICS	$\overline{X}$	s	n	$\overline{X}$	s	n	t	SIG
Highest Grade	9.48	2.61	230	8.66	3.46	213	2.83	++

TABLE 3-7. ANALYSIS OF DEMOGRAPHIC DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

AGENCY #7 - TOPS

ATTRIBUTE CHARACTERISTICS	EXPERIMENTAL GROUP		CONTROL GROUP			
	OBSERVED FREQUENCY	(%)	OBSERVED FREQUENCY	(%)	X^2	SIG
Sex (% male)	39/279	14.0	5/106	4.7	5.63	+
Ethnic						
White	52/276	18.8	16/103	15.5	.36	-
Black	19/276	6.9	5/103	4.9	.23	-
Spanish	188/276	68.1	76/103	73.8	.89	-
Criminal Record	21/128	16.4	Bad Data			
Speak English	201/247	81.3	52/58	89.7	1.73	-
Read English	196/247	79.4	51/57	89.5	2.49	-
Write English	195/247	79.0	50/57	87.7	1.75	-
Citizenship	195/265	73.6	52/60	86.7	3.90	+
Drive Car	17/131	13.0	Bad Data			
Own Car	16/131	12.2	Bad Data			
Barriers to Employment						
Lack of Skills	36/283	12.7	19/107	17.8	1.24	-
Dependent Children	10/283	3.5	7/107	6.5	1.04	-
Lack of Experience	16/283	5.7	10/107	9.3	1.16	-
Language	60/283	21.2	13/107	12.1	3.61	-
Too Old	11/283	3.9	5/107	4.7	.004	-
Ex-Offender	0/283	0.0	0/107	0.0	.00	-
Physical Handicap	1/283	0.4	2/107	1.9	.77	-
Lack of Education	123/128	43.5	23/107	21.5	15.07	+++
Mental Handicap	0/283	0.0	0/107	0.0	0	-

VARIABLE CHARACTERISTICS	EXPERIMENTAL GROUP				CONTROL GROUP				
	$\overline{X}$	s	n		$\overline{X}$	s	n	t	SIG
Highest Grade	10.86	1.78	280		10.35	2.43	106	2.26	+

TABLE 3-8. ANALYSIS OF DEMOGRAPHIC DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

AGENCY #8 - FOCUS

ATTRIBUTE CHARACTERISTICS	EXPERIMENTAL GROUP OBSERVED FREQUENCY	(%)	CONTROL GROUP OBSERVED FREQUENCY	(%)	x^2	SIG
Sex (% male)	48/95	50.5	56/95	58.9	1.04	-
Ethnic						
White	0/95	0.0	2/95	2.1	0.51	-
Black	0/95	0.0	9/95	9.5	7.46	++
Spanish	95/95	100	84/95	88.4	9.65	++
Criminal Record	7/91	7.7	0/92	0.0	5.42	+
Speak English	15/74	20.3	42/94	44.7	9.94	++
Read English	16/73	21.9	37/93	39.8	5.21	+
Write English	16/73	21.9	36/93	38.7	4.61	+
Citizenship	48/73	65.8	66/87	75.9	1.52	-
Drive Car	44/94	46.8	41/95	43.2	0.13	-
Own Car	24/93	25.8	27/81	33.3	0.85	-
Barriers to Employment						
Lack of Skills	1/95	1.1	0/95	0.0	0.00	-
Dependent Children	0/95	0.0	0/95	0.0	0.00	-
Lack of Experience	11/95	11.6	1/95	1.1	7.21	++
Language	47/95	49.5	50/95	52.6	0.08	-
Too Old	0/95	0.0	0/95	0.0	0.00	-
Ex-Offender	1/95	1.1	0/95	0.0	0.00	-
Physical Handicap	0/95	0.0	0/95	0.0	0.00	-
Lack of Education	65/95	68.4	60/95	63.2	0.37	-
Mental Handicap	0/95	0.0	0/95	0.0	0.00	-

VARIABLE CHARACTERISTICS	EXPERIMENTAL GROUP $\overline{X}$	s	n	CONTROL GROUP $\overline{X}$	s	n	t	SIG
Highest Grade	9.73	2.35	94	9.59	2.77	95	0.37	-

The demographic data analyzed and presented in these tables is a subset of the data obtained from the data collection forms shown earlier. When it became apparent that the analysis of the New Jersey experimental data would not be sufficient for the purpose of evaluating the CJMS, the continued analysis of these demographic data was halted.

The data presented in Tables 3-2 through 3-8 show that for each agency there was at least one demographic characteristic which was significantly different between the two groups. As an example, the data from BICC (Table 3-2) shows that there were eight demographic variables significantly different at the 99.9% level of confidence. This includes the sex, ethnic, and education characteristics.

3.2.2 Referral, Placement and Follow-up Data

Tables 3-9 through 3-16 summarize some of the data obtained from the data collection form, shown earlier, regarding the job and training referrals recorded for the experimental and control groups. All the tables are in the same format. Table 3-9 contains the total data across all the agencies. The remainder of the tables show the data on an individual agency basis.

Almost all the data shown in these tables come directly from the data collection form shown in Figure 3-1. The tables have been divided into four blocks with each block numbered. The correspondence between the data collection forms and the data in each block will be briefly discussed before the data itself is analyzed.

Block ①. The data showing the distribution of total experimental and control group clients by their status at the time the data were collected comes from the "Client's Current Status" entry on line B of page 1. The data collection form listed 7 legitimate code values. The block ① list contains two other code values which were only to be used to record referral outcomes on page 2. These two values, i.e., Not Accepted by Employer and Not Accepted by Trainer, appeared often enough in "Client's Current Status" to warrant them being listed. They are, for the purpose of ascertaining the client's current status, equivalent to Closed-Referred-Not Accepted.

AGENCY # Totals

TABLE 3-9. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

①

	Experimental		Control	
Total Processed	2619		1170	
Total Referred	1186	(45.3)	411	(35.1)
Client Status: Pending Referral	237	(9.0)	2	(0.2)
Pending Job Acceptance	12	(0.4)	1	(0.1)
Pending Training Accept.	8	(0.3)	1	(0.1)
Accept Into Job	455	(17.4)	206	(17.6)
Accept Training	215	(8.2)	36	(3.1)
Closed Not Referred	1194	(45.6)	757	(64.7)
Not Accepted by Employer	4	(0.2)	0	(0)
Not Accept by Train.	31	(1.2)	0	(0)
Closed-Rfd-Not Accept.	461	(17.6)	167	(14.3)
Out of Range	2	(0.1)	0	0

②

Referral Result Codes

	Pend. Ref.	Pend. Job Accept.	Pend. Trng. Accept.	Accepted		Not Accepted				Unknown	Missing & Out of Range	Referral Code		Total Nos. of Ref.	Number of Ref. Dates
				Job	Training	By Empl.	By Train.	By Client Valid	By Client NonV.			Job	Training		
Exp. Ref. Result:															
1	0	12	9	445	346	172	55	16	53	48	1463	703	457	1160	1142
2	1	3	0	58	16	54	10	6	10	10	2451	138	31	169	166
3	0	1	0	2	2	13	0	0	2	1	2598	20	2	22	21
4	0	0	0	0	0	3	1	0	0	0	2615	3	1	4	4
Control Ref. Result:															
1	1	0	4	197	41	95	30	10	8	12	772	308	82	390	389
2	0	0	0	18	1	14	0	1	1	0	1135	33	2	35	35
3	0	0	0	0	0	3	0	0	0	0	1167	3	1	4	4
4	0	0	0	0	0	0	0	0	0	0	1170	0	0	0	0

TABLE 3-9. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

AGENCY Totals

DATA ABOUT REFERRALS

③

Experimental	Cluster Number	Date Hired	Date Terminated	Grad Training Yes	Grad Training No	Date Grad.
Ref. 1	597	30	11	8	5	9
2	85	4	1	0	0	0
3	12	0	0	0	0	0
4	1	0	0	0	0	0
Control						
Ref. 1	210	50	5	2	0	6
2	17	10	0	1	0	1
3	2	0	0	0	0	0
4	0	0	0	0	0	0

④

		Job Followup			Training Followup					
		Still Working Yes	No	Date of Followup	Still in Training Yes	No	Training Grad. Yes	No	Date of Followup	Training Grad.Date
Experimental Followup	1	202	62	276	106	201	80	207	309	79
	2	2	2	2	0	0	0	0	0	0
-	3	0	0	0	0	0	0	0	0	0
Control Followup	1	64	18	82	5	10	2	9	15	5
	2	2	1	3	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0

AGENCY # 1 BICC

TABLE 3-10. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/ EXPERIMENT

	Experimental		Control	
Total Processed	1561		295	
Total Referred	599	(38.4)	113	(38.3)
Client Status: Pending Referral	147	(9.4)	0	
Pending Job Acceptance	8	(0.5)	0	
Pending Training Accept.	3	(0.2)	0	
Accept Into Job	186	(11.9)	39	(13.2)
Accept Training	71	(4.5)	0	
Closed Not Referred	814	(52.1)	182	(61.7)
Not Accepted by Employer	1	(0.1)	0	
Not Accept by Train.	1	(0.1)	0	
Closed-Rfd-Not Accept.	329	(21.1)	74	(25.1)
Out of Range	1	(0.1)	0	

Referral Result Codes

	Pend. Ref.	Pend. Job Accept.	Pend. Trng. Accept.	Accepted		Not Accepted				Unknown	Missing & Out of Range	Referral Code		Total Nos. of Ref.	Number of Ref. Dates
				Job	Training	By Empl.	By Train.	By Client Valid	By Client NonV.			Job	Training		
Exp. Ref. Result:															
1	0	8	4	173	130	150	31	7	44	41	973	390	201	591	562
2	1	3	0	36	10	42	10	0	7	5	1447	90	25	115	112
3	0	1	0	1	2	6	0	0	0	1	1550	10	2	12	11
4	0	0	0	0	0	1	1	0	0	0	1559	1	1	2	2
Control Ref. Result:															
1	0	0	0	38	0	61	5	0	6	0	185	104	5	109	112
2	0	0	0	2	0	8	0	0	0	0	285	10	0	10	10
3	0	0	0	0	0	2	0	0	0	0	293	2	0	2	2
4	0	0	0	0	0	0	0	0	0	0	295	0	0	0	0

AGENCY #1 BICC TABLE 3-10. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

DATA ABOUT REFERRALS

Experimental	Cluster Number	Date Hired	Date Terminated	Grad Training Yes	Grad Training No	Date Grad.
Ref. 1	268	24	5	8	5	9
2	58	1	0	0	0	0
3	6	0	0	0	0	0
4	1	0	0	0	0	0
Control						
Ref. 1	12	5	0	0	0	0
2	1	2	0	0	0	0
3	1	0	0	0	0	0
4	0	0	0	0	0	0

		Job Followup			Training Followup					
		Still Working Yes	Still Working No	Date of Followup	Still in Training Yes	Still in Training No	Training Grad. Yes	Training Grad. No	Date of Followup	Training Grad.Date
Experimental Followup	1	32	31	63	13	97	43	61	108	36
	2	0	2	2	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
Control Followup	1	0	3	3	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0

AGENCY # 2 Atlantic City TABLE 3-11. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/
Model Cities CLEFF EXPERIMENT

	Experimental		Control	
Total Processed	139		26	
Total Referred	43	(30.9)	11	(42.3)
Client Status: Pending Referral	33	(23.7)	0	
Pending Job Acceptance	0		0	
Pending Training Accept.	0		0	
Accept Into Job	17	(12.2)	11	(42.3)
Accept Training	21	(15.1)	0	
Closed Not Referred	63	(45.3)	15	(57.7)
Not Accepted by Employer	0		0	
Not Accept by Train.	0		0	
Closed-Rfd-Not Accept.	5	(3.6)	0	
Out of Range	0		0	

Referral Result Codes

	Pend. Ref.	Pend. Job Accept.	Pend. Trng. Accept.	Accepted		Not Accepted					Missing & Out of Range	Referral Code		Total Nos. of Ref.	Number of Ref. Dates
				Job	Training	By Empl.	By Train.	By Client Valid	By Client NonV.	Unknown		Job	Training		
Exp. Ref. Result:															
1	0	0	0	15	27	0	0	0	0	0	97	16	27	43	43
2	0	0	0	1	0	0	0	0	0	0	138	1	0	1	1
3	0	0	0	0	0	0	0	0	0	0	139	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	139	0	0	0	0
Control Ref. Result:															
1	0	0	0	11	1	0	0	0	0	0	14	9	1	10	4
2	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0

AGENCY #2 Atlantic City Model Cities

TABLE 3-11. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

DATA ABOUT REFERRALS

Experimental	Cluster Number	Date Hired	Date Terminated	Grad Training Yes	Grad Training No	Date Grad.
Ref. 1	7	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
Control						
Ref. 1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0

		Job Followup			Training Followup					
		Still Working Yes	Still Working No	Date of Followup	Still in Training Yes	Still in Training No	Training Grad. Yes	Training Grad. No	Date of Followup	Training Grad.Date
Experimental Followup	1	1	0	1	5	8	7	6	13	6
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
Control Followup	1	0	0	0	0	1	1	0	1	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0

AGENCY # 3 Atlantic City Vocational Rehabilitation

TABLE 3-12. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

	Experimental		Control	
Total Processed	183		296	
Total Referred	87	(47.5)	44	(14.9)
Client Status: Pending Referral	17	(9.3)	0	
Pending Job Acceptance	0		0	
Pending Training Accept.	0		0	
Accept Into Job	36	(19.7)	33	(11.1)
Accept Training	34	(18.6)	7	(2.4)
Closed Not Referred	78	(42.6)	252	(85.1)
Not Accepted by Employer	0		0	
Not Accept by Train.	0		0	
Closed-Rfd-Not Accept.	17	(9.2)	4	(1.4)
Out of Range	1	(0.5)	0	

Referral Result Codes

	Pend. Ref.	Pend. Job Accept.	Pend. Trng. Accept.	Accepted		Not Accepted				Unknown	Missing Out of Range	Referral Code		Total Nos. of Ref.	Number of Ref. Dates
				Job	Training	By Empl.	By Train.	By Client Valid	By Client NonV.			Job	Training		
Exp. Ref. Result:															
1	0	0	0	34	42	2	3	1	3	0	98	38	45	83	86
2	0	0	0	4	0	0	0	0	1	0	178	5	0	5	5
3	0	0	0	0	0	0	0	0	0	0	183	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	183	0	0	0	0
Control Ref. Result:															
1	1	0	0	34	9	1	0	0	1	0	250	34	9	43	44
2	0	0	0	0	0	0	0	0	0	0	296	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	296	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	296	0	0	0	0

1) Includes 5 with referral result= closed not referred

AGENCY #3 Atlantic City Vocational Rehabilitation

TABLE 3-12. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

DATA ABOUT REFERRALS

Experimental	Cluster Number	Date Hired	Date Terminated	Grad Training Yes	Grad Training No	Date Grad.
Ref. 1	30	6	6	0	0	0
2	3	1	1	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
Control						
Ref. 1	37	1	1	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0

		Job Followup			Training Followup				Date of Followup	Training Grad.Date
		Still Working		Date of Followup	Still in Training		Training Grad.			
		Yes	No		Yes	No	Yes	No		
Experimental Followup	1	8	3	11	11	15	13	13	26	6
	2	0	0	0	0	0	0	0	0	0
-	3	0	0	0	0	0	0	0	0	0
Control Followup	1	0	2	2	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0

AGENCY # 5 New Brunswick Vocational Rehabilitation

TABLE 3-13. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

	Experimental		Control	
Total Processed	125		126	
Total Referred	67	(53.5)	35	(27.8)
Client Status: Pending Referral	0		0	
Pending Job Acceptance	0		0	
Pending Training Accept.	0		0	
Accept Into Job	50	(40.0)	31	(24.6)
Accept Training	10	(8.0)	2	(1.6)
Closed Not Referred	58	(46.4)	91	(72.2)
Not Accepted by Employer	0		0	
Not Accept by Train.	0		0	
Closed-Rfd-Not Accept.	7	(5.6)	2	(1.6)
Out of Range	0		0	

Referral Result Codes

	Pend. Ref.	Pend. Job Accept.	Pend. Trng. Accept.	Accepted		Not Accepted					Missing & Out of Range	Referral Code		Total Nos. of Ref.	Number of Ref. Dates
				Job	Training	By Empl.	By Train.	By Client Valid	By Client NonV.	Unknown		Job	Training		
Exp. Ref. Result:															
1	0	0	0	48	12	2	0	0	1	0	62	49	13	62	61
2	0	0	0	1	2	0	0	0	0	0	122	1	2	3	3
3	0	0	0	0	0	0	0	0	0	0	125	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	125	0	0	0	0
Control Ref. Result:															
1	0	0	0	25	6	0	0	0	0	0	95	26	5	31	32
2	0	0	0	4	0	0	0	0	0	0	122	4	0	4	4
3	0	0	0	0	0	0	0	0	0	0	126	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	126	0	0	0	0

AGENCY #5 New Brunswick Vocational Rehabilitation

TABLE 3-13. REFERRAL, PLACEMENT AND FOLLOW-UP FROM THE NEW JERSEY/CLEFF EXPERIMENT

DATA ABOUT REFERRALS

Experimental	Cluster Number	Date Hired	Date Terminated	Grad Training Yes	Grad Training No	Date Grad.
Ref. 1	43	0	0	0	0	0
2	2	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
Control						
Ref. 1	19	6	1	1	0	1
2	3	1	0	1	0	1
3	0	0	0	0	0	0
4	0	0	0	0	0	0

		Job Followup			Training Followup					
		Still Working		Date of Followup	Still in Training		Training Grad.		Date of Followup	Training Grad.Date
		Yes	No		Yes	No	Yes	No		
Experimental Followup	1	17	2	19	4	5	3	4	9	4
	2	0	0	0	0	0	0	0	0	0
-	3	0	0	0	0	0	0	0	0	0
Control Followup	1	19	1	20	2	3	0	3	5	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0

AGENCY # 6 Perth Amboy Model Cities

TABLE 3-14. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

	Experimental		Control	
Total Processed	233		225	
Total Referred	158	(67.8)	108	(48.0)
Client Status: Pending Referral	17	(7.3)	0	
Pending Job Acceptance	1	(0.4)	1	(0.4)
Pending Training Accept.	0		0	
Accept Into Job	104	(44.6)	68	(30.2)
Accept Training	15	(6.4)	5	(2.2)
Closed Not Referred	58	(24.9)	117	(52.0)
Not Accepted by Employer	0		0	
Not Accept by Train.	0		0	
Closed-Rfd-Not Accept.	38	(16.3)	34	(15.1)
Out of Range	0		0	

Referral Result Codes

	Pend. Ref.	Pend. Job Accept.	Pend. Trng. Accept.	Accepted		Not Accepted					Missing & Out of Range	Referral Code		Total Nos. of Ref.	Number of Ref. Dates
								By Client							
				Job	Training	By Empl.	By Train.	Valid	NonV.	Unknown		Job	Training		
Exp. Ref. Result:															
1	0	1	0	109	19	10	0	4	4	6	80	134	22	156	158
2	0	0	0	13	3	11	0	5	1	5	195	35	3	38	38
3	0	0	0	1	0	7	0	0	2	0	223	10	0	10	10
4	0	0	0	0	0	2	0	0	0	0	231	2	0	2	2
Control Ref. Result:															
1	0	0	3	65	8	22	1	3	1	4	118	95	12	107	107
2	0	0	0	11	0	5	0	0	0	0	209	16	0	16	16
3	0	0	0	0	0	1	0	0	0	0	224	1	0	1	1
4	0	0	0	0	0	0	0	0	0	0	225	0	0	0	0

AGENCY #6 Perth Amboy Model Cities

TABLE 3-14. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

DATA ABOUT REFERRALS

Experimental	Cluster Number	Date Hired	Date Terminated	Grad Training Yes	Grad Training No	Date Grad.
Ref. 1	81	0	0	0	0	0
2	19	0	0	0	0	0
3	6	0	0	0	0	0
4	0	0	0	0	0	0
Control						
Ref. 1	96	38	3	1	1	5
2	13	7	0	0	0	0
3	1	0	0	0	0	0
4	0	0	0	0	0	0

		Job Followup			Training Followup					
		Still Working Yes	Still Working No	Date of Followup	Still in Training Yes	Still in Training No	Training Grad. Yes	Training Grad. No	Date of Followup	Training Grad.Date
Experimental Followup	1	74	19	93	8	7	3	11	15	4
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
Control Followup	1	44	8	52	2	6	1	6	8	5
	2	2	1	3	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0

AGENCY # 7 TOPS TABLE 3-15. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/ CLEFF EXPERIMENT

	Experimental		Control	
Total Processed	283		107	
Total Referred	172		63	
Client Status:				
Pending Referral	11	(3.9)	0	
Pending Job Acceptance	0		0	
Pending Training Accept.	0		1	(0.9)
Accept Into Job	34	(12.0)	9	(8.4)
Accept Training	54	(19.1)	15	(14.0)
Closed Not Referred	100	(35.3)	44	(41.1)
Not Accepted by Employer	3	(1.1)	0	
Not Accept by Train.	30	(10.6)	0	
Closed-Rfd-Not Accept.	51	(18.0)	38	(35.5)
Out of Range	0		0	

Referral Result Codes

	Pend. Ref.	Pend. Job Accept.	Pend. Trng. Accept.	Accepted		Not Accepted					Missing & Out of Range	Referral Code		Total Nos. of Ref.	Number of Ref. Dates
				Job	Training	By Empl.	By Train.	By Client Valid	By Client NonV.	Unknown		Job	Training		
Exp. Ref. Result:															
1	0	0	0	38	108	0	20	0	0	0	117	38	134	172	172
2	0	0	0	3	0	0	0	0	0	0	280	3	0	3	3
3	0	0	0	0	0	0	0	0	0	0	283	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	283	0	0	0	0
Control Ref. Result:															
1	0	0	1	10	10	0	22	5	0	7	52	13	40	53	51
2	0	0	0	0	0	0	0	0	0	0	107	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	107	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	107	0	0	0	0

AGENCY #7 TOPS

DATA ABOUT REFERRALS

TABLE 3-15. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

Experimental	Cluster Number	Date Hired	Date Terminated	Grad Training Yes	Grad Training No	Date Grad.
Ref. 1	142	0	0	0	0	0
2	2	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
Control						
Ref. 1	35	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0

		Job Followup			Training Followup					
		Still Working Yes	Still Working No	Date of Followup	Still in Training Yes	Still in Training No	Training Grad. Yes	Training Grad. No	Date of Followup	Training Grad.Date
Experimental Followup	1	34	7	41	54	69	11	112	123	23
	2	0	0	0	0	0	0	0	0	0
-	3	0	0	0	0	0	0	0	0	0
Control Followup	1	1	4	5	1	0	0	0	1	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0

AGENCY # 8 FOCUS

TABLE 3-16. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEFF EXPERIMENT

	Experimental		Control	
Total Processed	95		95	
Total Referred	60	(63.2)	37	(38.9)
Client Status:				
Pending Referral	12	(12.6)	2	(2.1)
Pending Job Acceptance	3	(3.2)	0	
Pending Training Accept.	5	(5.3)	0	
Accept Into Job	28	(29.5)	15	(15.8)
Accept Training	10	(10.5)	7	(7.4)
Closed Not Referred	23	(24.2)	56	(58.9)
Not Accepted by Employer	0		0	
Not Accept by Train.	0		0	
Closed-Rfd-Not Accept.	14	(14.7)	15	(15.8)
Out of Range	0		0	

Referral Result Codes

	Pend. Ref.	Pend. Job Accept.	Pend. Trng. Accept.	Accepted		Not Accepted					Missing & Out of Range	Referral Code		Total Nos. of Ref.	Number of Ref. Dates
				Job	Training	By Empl.	By Train.	By Client Valid	By Client NonV.	Unknown		Job	Training		
Exp. Ref. Result:															
1	0	3	5	28	8	8	1	4	1	1	36	38	15	53	60
2	0	0	0	0	1	1	0	1	1	0	91	3	1	4	4
3	0	0	0	0	0	0	0	0	0	0	95	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	95	0	0	0	0
Control Ref. Result:															
1	0	0	0	14	7	11	2	2	0	1	58	27	10	37	39
2	0	0	0	1	1	1	0	1	1	0	90	3	2	5	5
3	0	0	0	0	0	0	0	0	0	0	95	0	1	1	1
4	0	0	0	0	0	0	0	0	0	0	95	0	0	0	0

AGENCY #8 FOCUS

TABLE 3-16. REFERRAL, PLACEMENT AND FOLLOW-UP DATA FROM THE NEW JERSEY/CLEF EXPERIMENT

DATA ABOUT REFERRALS

Experimental	Cluster Number	Date Hired	Date Terminated	Grad Training Yes	Grad Training No	Date Grad.
Ref. 1	26	0	0	0	0	0
2	1	2	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
Control						
Ref. 1	11	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0

		Job Followup			Training Followup					
		Still Working Yes	Still Working No	Date of Followup	Still in Training Yes	Still in Training No	Training Grad. Yes	Training Grad. No	Date of Followup	Training Grad.Date
Experimental Followup	1	36	0	48	11	0	0	0	15	0
	2	1	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0
Control Followup	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0

The total number of clients in the experimental and control groups comes from the entries on line B of page 1 that indicate what group the client is in. The entry "Total Referred" is a calculated entry obtained by summing the number of clients whose current status was entered as one of the following values:

Pending Job Acceptance
Pending Training Acceptance
Accepted Into Job
Accepted Into Training
Not Accepted by Employer
Not Accepted by Trainer
Closed-Referred-Not Accepted

One should note that each client can only have one current status code and can belong to only one of the two groups.

The numbers in parentheses next to the number of clients in each status are the percent of total clients in the experimental or control groups.

Block ②. The data shown in this block come from the entries given in block U at the top of page 2 of the data collection form. Specifically, the first 10 columns of block ② show the distribution of referral result codes. The next column of block ② shows the total number of clients for which no referral result code was entered. The next two columns listed under Referral Code show the number of referrals listed as referrals to jobs and to training. The next-to-last column is a calculated entry obtained by adding the entries giving the number of referrals to jobs and training. The last column shows the number of referrals for which a date of referral was entered.

Block ② shows these data for the experimental and control groups. In addition, it shows these data for each referral recorded. The data collection form had room for up to 5 referrals per individual and, in addition, had an entry which indicated if more than 5 referrals were made on the behalf of a given individual. No such cases were identified and no individual was recorded having more than four referrals.

Block ③. This block contains one data item from block U of the data collection form; i.e., the cluster number that best represents the job or training program to which the client was referred.

The other entries in block ③ come from block V of the data collection form. These are the hire date, the termination date, and--if the client was placed in a training program--a code to indicate if the client graduated and, if so, the date of graduation. One should note that the entries in block V of the data collection form were linked to the referrals recorded in block U by the referral line number.

Block ④. The entries in this block come from blocks W and X on page 2 of the data collection form. They are all concerned with follow-up data. While not explicitly shown on the data collection form, the referral line number was entered prior to the follow-up data to indicate which referral the follow-up pertained to.

One should note that the client's current status is supposed to reflect the latest status. In other words, over the course of the experiment, a client might have been referred to and accepted into a training program, graduated, and then referred to and accepted into a job. Thus the client's current status would be Accepted Into Job but there would be two referrals recorded for this client.

3.2.2.1 Discussion of the Referral, Placement and Follow-up Data

Taken at face value, the data in block ① of Table 3-9 shows that approximately the same percentage of experimental and control group clients were placed into jobs. Examining the individual agency data, one sees that there is considerable variation in these numbers for each agency.

For the experimental group, the percent placed into a job varied between a low of 11.9% for BICC to a high of 44.6% for the Perth Amboy Model Cities agency. For the control group, the percent placed into a job varied between a low of 8.4% for TOPS to a high of 42.3% for the Atlantic City Model Cities agency.

The summary (all agency) data shows that a much larger percentage of experimental group clients were placed into training than were control group clients. However, examination of the individual agency data reveals that BICC placed 71 clients into training (33% of all experimental group clients placed into training) while its control group, drawn from a different agency, had no clients placed into training. In addition, the TOPS agency recorded 54 experimental group clients and 15 control group clients as accepted into training. The TOPS agency is essentially a training organization which does placement into jobs only for its training enrollees. The control group from TOPS was drawn from clients who applied and were screened prior to the beginning of the experiment. Once the experiment began, all clients applying to this agency were given the Cleff instruments and some were accepted no matter what their resultant scores were. The difference in the numbers from TOPS is mainly due to the difference in size between the experimental and control groups from this agency. If one examines the percentage of clients accepted into training from the other five agencies, one sees that 90 out of 775 experimental group clients were referred and accepted into training (11.6%), compared to only 21 of 768 control group clients (2.7%). This is an even greater difference.

In addition, for these five agencies, the accepted-into-jobs percentages are 30.3% (235 out of 775) for the experimental group and 20.6% (158 out of 768) for the control group. Thus one sees that looking at the total data is a little misleading due, in a large part, to the large size of the BICC experimental group (1561 out of a total of 2619, or 59.6%) and the much smaller size of its control group. One also should note the large difference between the experimental group clients whose status is pending referral and those from the control group in that status. This also tends to distort the data since the outcomes of agency actions on behalf of these clients is not known. Adjusting the two group totals to remove these "pending" clients will change the experimental group client-status percentages but will have hardly any effect on the control group. These factors all tend to make analysis of the total experimental and control group data somewhat misleading.

Further examination of the data in Table 3-9 shows the lack of data indicating when the client was hired into the job or enrolled into training (date hired). All told, only 34 hire dates were recorded. In addition, one sees that the majority of clients who had at least one referral made on their behalf are recorded as only having had this one referral.

It is Ultrasystems' opinion that the comparison of the referral results between the two groups is a major point in evaluating the effectiveness of the Cleff Job Matching System. This stems from the fact that the CJMS is designed to provide the referral interviewer or counselor with information directly applicable to the job-client matching process. Whereas the evaluation of the New Jersey experiment was primarily aimed at examing the post-placement performance of experimental and control group clients (to determine if the CJMS scores are useful and effective measures for matching clients and jobs) there were included secondary measures dealing with the evaluation of the distribution referral outcomes. This is a somewhat weaker or less direct measure of system effectiveness in the sense that the decision of an employer to hire an individual would not be based--in whole or in part--upon the CJMS results. Therefore, whereas the system might have indicated that the client is a "good" match for the job, the employer might judge this relationship using different criteria. The data shown in Tables 3-9 through 3-16 show that there is hardly any information which could be used to examine post-placement success (i.e., for the experimental group, only 12 termination dates are recorded). One should bear in mind that the capture of this type of information was Ultrasystems' responsibility and that the changes made to the scope of this project eliminated the implementation of the follow-up interviews. Therefore, the available data cannot be used to examine this aspect of the CJMS and attention will instead be focused on the issue of referral outcomes. Even here, the curtailment of the analysis of the New Jersey experimental data, due to the refocusing of the evaluation on the SER experiment, restricts the analyses that can be done.

The client's current status distribution in block ① of Table 3-9 indicates that 1186 experimental group and 411 control group clients were referred to either jobs or training or to both. The data shown in block ② show that a total of 1355 referrals (864 job and 491 training referrals as reported by types of referral) were made on behalf of experimental group clients. The corresponding data for the control group clients is 429 referrals (344 job and 85 training referrals). The referral result data shown in block ② lists 1349 referral results for the experimental group and 436 referral results for the control group. Thus there we are missing some data items for each referral. The referral result distributions are for all referrals independent of type, i.e., job or training. The data was, unfortunately, not disaggregated into referral results by type of referral prior to halting the New Jersey analysis.

Table 3-17 shows the total distribution of referral results for the experimental and control groups. The percentage distribution is also shown and is then adjusted to remove those referrals whose result is listed as pending referral, pending job acceptance or pending training acceptance. Since the referral result data has not been disaggregated by the type of referral (to job or training) we are going to have to make some estimate of the total job and training referrals to obtain the percent of each which were successful. As mentioned earlier, the data item that indicates the type of referral shows that of the 1355 experimental group referrals, recorded by type, 63.8% of these were to jobs and 36.2% to training. For the control group, the data show that of the 429 referrals, recorded by type, 80.2% were to jobs and 19.8% to training.

Applying these percentages to the adjusted totals shown in Figure 3-17, one obtains an estimate of the referrals to jobs or training that the referral results pertain to. These estimates (and the data used to generate them) are shown in Table 3-18 for each agency and for the total experimental and control groups. Thus the estimated job and training referrals against which the results will be applied are:

1) Experimental group: 844 job and 429 training referrals

2) Control group: 346 job and 85 training referrals

These estimates combined with the number of successful referrals yield the placement/referral estimates shown in the last two columns of Table 3-18.

Thus one sees that the percentage of successful job referrals is approximately the same for the two groups and that the percent of successful training referrals is higher for the experimental group.

Examination of the individual agency data shown in Table 3-18 shows the following:

1) For the three agencies, ACMC, ACVR, AND NBVR, the total number of referrals and the number of successful referrals are almost the same. For these three agencies, the total number of successful referrals (to jobs and training) is 186 for the experimental group and 90 for the control group. There were 13 experimental group referrals which resulted in nonaccepted results and 2 such referrals from the control groups.

TABLE 3-17. SUMMARY OF REFERRAL RESULT DISTRIBUTION

	Experimental			Control		
Referral Result	Total	% of Total	Adjusted Percent	Total	% of Total	Adjusted Percent
Pending Referral	1	.001	X	1	.002	X
Pending Job Acceptance	16	.012	X	0	0	X
Pending Training Acceptance	9	.007	X	4	.009	X
Accepted Into Job	505	.374	.382	215	.493	.499
Accepted Into Training	364	.270	.275	42	.099	.097
Not Accepted:						
• By Employer	242	.179	.183	112	.257	.260
• By Trainer	66	.049	.050	30	.069	.070
• By Client						
-Valid Reason	22	.016	.017	11	.025	.026
-Nonvalid Reason	65	.048	.049	9	.021	.021
-Reason Unknown	59	.044	.044	12	.028	.028
Total	1349			436		
Adjusted Total	1323			431		

TABLE 3-18. ESTIMATES OF PLACEMENT PER REFERRAL RATIOS

		Referrals By Type			% Distribution		Total Referrals	Estimate Referrals		Referral Results		% Successful	
		To Job	To Training	Total	To Job	To Training	With Results Adjusted	To Job	To Training	Accepted Into Job	Accepted Into Training	To Job	To Training
BICC	Experimental	491	229	720	.682	.318	698	476	222	210	142	.441	.640
	Control	116	5	121	.959	.041	122	117	5	40	0	.342	0.000
ACMC	Experimental	17	27	44	.386	.614	43	17	27	16	27	.941	1.00
	Control	9	1	10	.900	.100	12	11	1	11	1	1.00	1.00
ACVR	Experimental	43	45	88	.489	.511	90	44	46	38	42	.864	.913
	Control	34	9	43	.791	.209	45	36	9	34	9	.944	1.00
NBVR	Experimental	50	15	65	.769	.231	66	51	15	49	14	.961	.933
	Control	30	5	35	.857	.143	35	30	5	29	6	.967	(1.20)
PAMC	Experimental	181	25	206	.879	.121	202	178	24	123	22	.691	.917
	Control	112	12	124	.903	.097	121	109	12	76	8	.697	.667
TOPS	Experimental	41	134	175	.234	.766	169	40	129	41	108	(1.025)	.837
	Control	13	40	53	.245	.755	54	13	41	10	10	.769	.244
FOCUS	Experimental	41	16	57	.719	.281	55	40	15	28	9	.700	.600
	Control	30	13	43	.698	.302	42	29	13	15	8	.517	.615
Total	Experimental	864	491	1355	.638	.362	1323	844	479	505	364	.598	.760
	Control	344	85	429	.802	.198	431	346	85	215	42	.621	.494

These data are hard to accept at face value. Ultrasystems does not know if it is a correct reflection of what really happened or is due to a failure to record all the referrals made for each client. One should bear in mind that the data was not collected by Ultrasystems. In addition, it is Ultrasystems' opinion that these agencies, staffed in whole or in part by Vocational Rehabilitation personnel, do not rigorously record placement-related events in the same manner as, say, the U.S. Employment Service does. In other words, only successful referrals may be recorded even though others are made. One should also note that placement of Vocational Rehabilitation clients is usually done through a direct job development process and not from open order job listings.

2) The percentage distributions of referrals by type is quite different between agencies and between the experimental and control groups for each agency. Thus, for example, the BICC agency had approximately a 2-to-1 split in job and training referrals. The control group for this agency, which was drawn from the Urban League in the Newark area, shows an almost total concentration on job referrals. BICC accounts for 46.3% of all experimental group training referrals and 39.0% of all accepted-in-training referral results. Its control group accounts for 5.9% of all control group training referrals and 0.0% of control group referrals resulting in acceptance into training.

The TOPS agency shows the highest percentage of referrals to training (for both the experimental and control groups) of all the agencies. Approximately 75% of all referrals from both groups were to training. In combination with BICC, these two agencies account for 73.3% of all experimental group clients referred to training , and 68.7% of all experimental group clients accepted into training. They account for 54.1% of all control group clients referred to training and 23.8% accepted into training.

3) Ignoring the issue raised in point 1 above, one obtains, from the data shown in Table 3-18, the following referral and referral result distributions from the five agencies excluding BICC and TOPS:

	Estimated Referrals		Accepted Into		Percent of Referrals Accepted	
	To Jobs	To Training	Job	Training	Job	Training
Experimental	328	128	254	114	.774	.891
Control	216	39	165	32	.764	.821

Thus, for these agencies, even though their operations are not precisely the same, the percentages of successful outcomes are approximately the same between the two groups. The reader should be cautious in viewing this data due to probable distortions in the data reported.

4) The fact that the control group for BICC was drawn from a different agency makes comparisons of its different group results difficult and probably invalid for the purposes of this evaluation. It is also important to note that BICC conducted its own training programs, as did TOPS. Thus, referrals to training and acceptance to same by these agencies could be and probably are distorted in the sense that they do not represent referrals made by agency personnel to a training program/organization which will interview the client and decide whether to accept this client into training. The situation for TOPS is even less clear, since TOPS is basically a training organization which does try and place its enrollees into jobs. Specifically, clients are referred to TOPS by other agencies and then TOPS may screen these clients and accept some for training. In this sense, they used the Cleff system to assist them in screening. Therefore, when one looks at the percent of their clients accepted into training, it indicates the results of their screening and not the results of their usage of the CJMS to choose the proper training program to refer a client to, with the resultant outcome a reflection of their choice as viewed by the training organization. One should note for TOPS that the percent of referrals resulting in job placements is high and indicates to Ultrasystems that the reporting may be distorted as discussed in (1) above.

This concludes the analyses that will be presented. Obviously, there are many other topics and issues that have not been discussed. It is Ultrasystems' opinion that for the purpose of evaluating the effectiveness of the CJMS the data available from the New Jersey experiment is inadequate. Therefore, the discussion will not continue, since Ultrasystems believes little will be learned. It should be noted that Ultrasystems did not do much in the way of analyzing and disaggregating this data. Thus, there is little more that can be discussed unless the data obtained is analyzed further. The following subsection will present some further explanation of the results of the New Jersey experiment, especially as regards the capture and analysis of data needed to perform a comparative evaluation of the placement effectiveness of the CJMS. This will be followed by a reivew of the results and conclusions presented in ADF-PDS's final status report on the New Jersey experiment. This report used essentially the same data as has been presented above but reached conclusions regarding the system's effectiveness.

Ultrasystems believes the analyses and conclusions documented in that report deserve to be discussed.

3.2.2.2 Concluding Remarks Related to the New Jersey Performance Data

It should be obvious that the data related to placement performance (referrals and referral outcomes) from the New Jersey experiment is not very clear and may in fact be distorted. It is therefore, in Ultrasystems' opinion, not acceptable on face value. Since the original evaluation design was modified to exclude any follow-up activities, by Ultrasystems, of the clients included in the New Jersey data base, it was impossible to resolve this data. It should also be pointed out that the manner in which the control group clients were selected from the agency files is not known. This sampling was conducted by ADP-PDS Incorporated and Ultrasystems has never seen a detailed description of how this was done.[1] The original experimental design specified a different mechanism for the generation of the control group based on time phasing the system's usage. As far as Ultrasystems could determine, this time phasing was never executed and the control group was drawn, in some fashion, from the agency files or, in the case of BICC, from some other agency.

The data presented above does not include any data related to the CJMS scores associated with the experimental group clients and with their job or training referrals (if any were made on their behalf). Client CJMS score data was received for the experimental group clients. This consisted of the individual SICL dimension scores and the clients' adjustment and difference indices (see Figure 3-1). The job (or training) program match scores would have to be calculated from the client input data using either the cluster profile that best represents the job or training program or, in the case of BICC, the job profiles obtained. These calculations were not done. As the data in Table 3-9, block ③ , indicates, cluster numbers were provided on 695 experimental group referrals. The total experimental group referrals is approximately 1355. Excluding BICC, the total referrals is approximately 635, and for these 362 had cluster numbers assigned For BICC, there were 720 referrals and 333 of these had cluster numbers assigned. In addition, 220 had a JOCL number. Thus, of the 720 referrals made by BICC, 553 have a job or cluster profile identified. Thus, it is not possible from the available data to do these calculations for all the referrals, since a Cleff job or cluster dimension profile cannot be determined.

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[1] As has been mentioned, Ultrasystems made recommendations early in the evaluation regarding the size of the control group client sample. These recommendations were aimed at trying to equalize the size of the control and experimental groups per agency. These clients were identified in Table 3-1 as the C5 control group and were to be randomly pulled from the agency files. In addition, another group of control clients was to be pulled in a selective manner. All of these were to have been placed into jobs and their number was to be determined after the C5 group was pulled. The number required was to be such that the total number of experimental and control group hires (for the follow-up interviews) would be equalized per agency. Thus the number of hires obtained from control groups (C1, C2, C3, and C5) would be compared to the total experimental hires and the difference would be made up by this new, special, control group. A total of 50 such clients were recorded. These have not been included in any of the data presented, as they were specially selected.

One should bear in mind that there were guidelines established which were to control the referral process based on the match and client scores. In particular, clients were not to be referred unless their job match index was greater than or equal to +0.5 and their adjustment index was greater than or equal to +0.25. Thus, when one examines the outcomes associated with experimental group clients, one could assume that all referrals, either to job or training, satisfied these criteria. This is the main reason why the analysis presented in Section 3.2.2.1 concentrated on the analysis of referral outcomes and not on the eventual outcomes of the services provided clients as measured by their "current status code." Thus, since the data shown in Table 3-18 indicates that the percentage of successful job referrals was approximately the same for both groups, one could conclude that the use of the CJMS to help direct the job match during the referral process did not lead to a greater percentage of successful referrals. One would have to assume that the score criteria given above were applied. Ultrasystems does not believe this is totally true although we have no hard data to substantiate this opinion. In addition, one should bear in mind that this only applies to job referral outcomes and not to subsequent job retention and performance.

There are of course other factors which are utilized in the referral process which the CJMS does not measure. In addition, as has been stated earlier, the decision to hire a referred client is the employer's and this decision was not apparently influenced by the system scores. Overriding all of this is our opinion that the referral data cannot be accepted on face value. Thus no conclusion can be justified and any discussion based on the percentage of successful job referral outcomes vis-a-vis the use of the CJMS would be pure speculation.

TABLE 3-19. CLIENT INDICES FOR EXPERIMENTAL GROUP CLIENTS; NEW JERSEY/CLEFF EXPERIMENT

Agency (Total Exp. Clients)	Client Adjustment Index					Client Difference Index				
	No. of Clients	Mean	Std.Dev.	Min.	Max.	No. of Clients	Mean	Std.Dev.	Min.	Max.
BICC (1561)	1278	50.674	34.003	-74.0	+100.0	1318	901.747	586.674	1	4775
ACMC (139)	131	35.618	38.678	-61.0	+ 96.0	135	910.585	598.529	64	2969
ACVR (183)	178	40.758	34.612	-45.0	+100.0	180	879.622	536.582	109	2651
NBVR (125)	118	36.246	37.322	-57.0	+ 99.0	119	855.555	520.827	7	2530
PAMC (233)	219	35.516	42.049	-75.0	+100.0	221	817.593	900.864	10	9333
TOPS (283)	265	36.585	34.344	-67.0	+ 97.0	272	692.926	427.992	29	3268
FOCUS (95)	86	44.826	36.739	-55.0	+ 97.0	95	558.158	422.797	65	2034
TOTAL (2619)	2275					2340				

Earlier it was mentioned that no CJMS score data was analyzed with regard to the clients and the referrals made on their behalf. Actually, Ultrasystems did obtain from the data received the distribution of the client's adjustment and difference indices. This data is presented in Table 3-19. The table shows all the data received. The data has not been disaggregated into cells based on whether the client was or was not referred to a job or a training program (or both) and if referred was or was not placed. Thus it is not possible to determine from the data shown in the table to what degree the client adjustment index criteria were adhered to. One sees from the data that for each agency the number of clients for which the two indices were provided is not the same nor is it equal to the total experimental group clients. The difference between the number of clients for which the adjustment index and the difference index are known is due to non-reporting and is troublesome. The difference between the total experimental clients processed and the total for which these indices were reported could be and probably is due to the fact that some clients only take the preference SICL and hence these indices are not obtainable. The experimental criteria on minimum scores for referral consideration did not explicitly indicate what is to be done for these clients. Apparently, the match index criteria would be the only criteria utilized.

In summary, the data obtained and the analyses completed do not provide adequate information from which any conclusions regarding the effectiveness of the use of the CJMS in the referral process can be drawn. The problems with the data, as collected, are, in Ultrasystems' opinion, due to

1) a low credibility due to the lack of a definitive control group sampling plan and the use of clients from a different agency for one of the control groups

2) in lieu of the above, a failure to run the experiment in the time-phased manner as originally designed

3) failure to obtain JOCLs on each job or training program associated with the referrals and placements made. In the absence of unique JOCLs the experimental data base failed to capture enough job or training program descriptions so that a cluster profile could be reasonably well assigned.

4) an apparent lack of complete referral data on each client leading to a lack of credibility in the placement/referral ratios

5) an experimental design that tended to ignore the substantial differences in the manner in which the participating agencies provide services to people, especially as regards job and/or training referrals

6) an experimental design that placed too much emphasis on the completion of the SICLs as the sole causal link in the comparison of placement performance. This could have been alleviated to some degree if the control group clients also took the SICLs and their resultant match and client scores were available for analysis. This would be done in such a manner that the scores for this group would not be made known to the agency staff. This suggestion ignores the ethical problem involved with having a person spend about two hours of their time completing the SICLs solely for the purpose of research. If such an approach had been utilized, even for a sample of the total control group, it would enable one to compare on a more direct basis the referrals that are selected, from the alternatives available, using either the "traditional" agency staff approach or the approach assisted by the CJMS.

3.3 REVIEW OF THE FINAL STATUS REPORT ON THE NEW JERSEY/CLEFF EXPERIMENT SUBMITTED BY ADP-PDS, INC.

The New Jersey/Cleff experiment was conducted by Personnel Data Systems, a subsidiary of ADP Inc., under contract to the Office of Economic Opportunity. The contract called for status reports to be submitted every three months during the course of the experiment. The final status report was submitted in June of 1973.[1]

The periodic status reports presented data on the experiment's progress in terms of total clients processed (in the experimental and control groups) and breakouts of their then current status using the definitions shown in block ① of Table 3-9. In addition, these reports discussed aspects of the various participating agency's involvement in the experiment. The statistical activity data presented in these periodic reports was obtained using the data collection forms developed by ADP-PDS for the experiment. The final status report presented statistical activity data based on the data collected using the forms developed by Ultrasystems (as shown in Figure 3-1). Thus the data presented earlier in this section and that presented and discussed in ADP-PDS's final status report were drawn from the same source.

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[1] The final status report was submitted to the Office of Economic Opportunity as Deliverable Item 1B2-6 under OEO Contract BIC-5261. The report has not been included as an appendix because of its size.

The final status report was not supposed to be an evaluation of the system's effectiveness based on the results of the New Jersey experiment.[1] It was supposed to be a final summary of the experimental activities and was to contain a training package. The report, however, did make statements, based on their analysis of the activity data, that were evaluative in nature. It is because Ultrasystems believes that the conclusions and/or the inferences made as to the system's effectiveness, by ADP-PDS, are not justified by the data that we have included this brief section. It is not our intent to refute each of the statements made in the final status report that we disagree with. Our intent is to discuss what we believe to be serious errors in the causal inferences that were drawn from the data presented. This is being done in the context of trying to learn from the experiences of the New Jersey experiment so that future comparative evaluations of the CJMS and other systems aimed at providing assistance in the areas of vocational assessment and man-job matching can be better formulated.

The final status report presented data very similar to that shown in Tables 3-1 and 3-9 through 3-18. Exhibit 3-1 shows the summary activity data presented in the final status report. In order to facilitate the comparison of the data shown in the exhibit with the data presented in Table 3-1 and 3-9 through 3-18, we have included in parentheses the corresponding numbers from these tables. The numbers are essentially the same although there are some differences. Exhibit 3-1 combines the two Atlantic City agencies into one and also includes both training and job acceptance status as one number, i.e., accepted, for each agency group. Exhibit 3-2 presents another data summary from the final status report. This table has the same data as shown in Exhibit 3-1 except it includes the counts of clients in pending job or training acceptance status categories as pending

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[1] The original contract awarded ADP-PDS Inc. by OEO did include tasks aimed at evaluating the results of the experiment. However, OEO later decided to fund a separate evaluation and thus the evaluative responsibility was no longer ADP-PDS's. Their responsibilities were to 1) operate the experiment, 2) provide technical assistance in the use of the CJMS, 3) capture the data needed for the evaluation, and 4) report on the activities of the experiment.

EXHIBIT 3-1

TABLE 1-4

1-10

SUMMARY OF CJMS PERFORMANCE BY AGENCY CONTROL (CTRL) VS. EXPERIMENTAL (EXP) GROUP

	FOCUS (8)						BICC (1)					
	CTRL			EXP			CTRL			EXP		
1) Total Processed	95	(95)	100%	95	(95)	100%	295	(295)	100%	1,560	(1561)	100%
2) Total Referred	37	(37)	39%	60	(60)	63%	113	(113)	38%	599	(599)	38%
3) Pending Ref.	2	(2)	2%	12	(12)	13%		(0)		147	(147)	10%
4) Closed, Not Ref.	56	(56)	59%	23	(23)	24%	182	(182)	62%	814	(814)	52%
5) Accepted	22	(22)	23%	38	(38)	40%	39	(39)	13%	258	(257)	17%
6) Not Accepted	15	(15)	16%	14	(14)	15%	74	(74)	25%	330	(331)	21%

	PERTH AMBOY (6)						TOPS (7)					
	CTRL			EXP			CTRL			EXP		
1) Total Processed	224	(225)	100%	233	(233)	100%	107	(107)	100%	283	(283)	100%
2) Total Referred	107	(108)	48%	158	(158)	68%	63	(63)	59%	173	(172)	61%
3) Pending Ref.		(0)		17	(17)	7%		(0)		9	(11)	3%
4) Closed, Not Ref.	117	(117)	52%	58	(58)	25%	44	(44)	41%	101	(100)	36%
5) Accepted	73	(73)	33%	119	(119)	51%	24	(24)	22%	89	(88)	31%
6) Not Accepted	33	(34)	15%	38	(38)	16%	38	(38)	36%	84	(84)	30%

	ATLANTIC CITY (2)+(3)						NEW BRUNSWICK (5)					
	CTRL			EXP			CTRL			EXP		
1) Total Processed	322	(322)	100%	322	(322)	100%	126	(126)	100%	125	(125)	100%
2) Total Referred	59	(55)	18%	129	(130)	40%	35	(35)	28%	67	(67)	54%
3) Pending Ref.		(0)		52	(50)	16%		(0)			(0)	
4) Closed, Not Ref.	263	(267)	82%	141	(141)	44%	91	(91)	72%	58	(58)	46%
5) Accepted	55	(51)	17%	107	(108)	33%	33	(33)	26%	60	(60)	48%
6) Not Accepted	4	(4)	1%	22	(22)	7%	2	(2)	2%	7	(7)	6%

EXHIBIT 3-2

TABLE 1-5

SUMMARY OF CJMS PERFORMANCE BY AGENCY AS A FUNCTION OF TOTAL REFERRED

	FOCUS						BICC					
	CTRL			EXP			CTRL			EXP		
Total Referred	37		100%	60		100%	113		100%	599		100%
Accepted	22		59%	38		64%	39		35%	258		43%
Pending Accept.		(0)		8	(8)	13%		(0)		11	(11)	2%
Not Accepted	15		41%	14		23%	74		65%	330		55%

	PERTH AMBOY						TOPS					
	CTRL			EXP			CTRL			EXP		
Total Referred	107		100%	158		100%	63		100%	173		100%
Accepted	73		68%	119		75%	24		38%	89		51%
Pending Accept.	1	(1)	1%	1	(1)	1%	1	(1)	2%		(0)	
Not Accepted	33		31%	38		24%	38		60%	84		49%

	ATLANTIC CITY						NEW BRUNSWICK					
	CTRL			EXP			CTRL			EXP		
Total Referred	59		100%	129		100%	35		100%	67		100%
Accepted	55		93%	107		83%	33		94%	60		90%
Pending Accept.		(0)			(0)			(0)			(0)	
Not Accepted	4		7%	22		17%	2		6%	7		10%

acceptance. We have included for this entry the corresponding data from Tables 3-9 through 3-16. The summary data presented in the ADP-PDS Table 4.1 part of Exhibit 3-3 is not consistent with the data presented in the two earlier exhibits. Specifically, the total control group processed using the data from Exhibit 3-1 is 1169 and not 1208. Ultrasystems' total is 1170. The total experimental group processed using the data from Exhibit 3-1 is 2618 and not 2636. Ultrasystems' total is 2619. The data shown in the ADP-PDS Table 4.2 part of Exhibit 3-3 disaggregates the clients based on their status code into those referred to jobs and training. Thus, if one looks at the status codes listed in block ① of Table 3-9, one sees that the client status codes: pending job acceptance, accepted into job, and not accepted by employer, all imply that the client was referred at least once to a job. Similarly for the training referrals based on the status codes: pending training acceptance, accepted into training, and not accepted by trainer. The status code closed-referred-not accepted applies to both job and training referrals. Ultrasystems did not disaggregate the input data to determine which clients in the status code were referred only to jobs or to training. In addition, one should bear in mind that a client can have only one current status code, at a given point in time, but in fact could have been referred to both jobs and training.

In the previous section Ultrasystems presented data, based on a simple estimation formula, that indicated the number of training and job referral transactions. This is not the same as the number of individuals involved in such transactions. The client current status distributions shown in Table 3-9 yield the following:

Client Current Status

	Associated with Job Referral	Associated w/Training Referral	Unknown Job or Training Association	Total
Experimental Group	471	254	461	1186
Control Group	207	37	167	411

EXHIBIT 3-3

TABLE 4.1

SUMMARY DATA FOR CONTROL AND EXPERIMENTAL GROUPS

	CONTROL			EXPERIMENTAL		
Total Processed	1,208	(1170)	100%	2,636	(2619)	100%
Total Referred	439	(411)	36%	1,189	(1186)	45%
Total Pending Referral	2	(2)	0%	237	(237)	9%
Total Closed, Not Referred	767	(757)	64%	1,210	(1194)	46%

TABLE 4.2

DISTRIBUTION OF THOSE REFERRED FOR CONTROL AND EXPERIMENTAL GROUPS

	CONTROL			EXPERIMENTAL		
Total Referred	439	(411)	100%	1,189	(1186)	100%
A) Jobs	360		82%	761		64%
B) Training	79		18%	428		36%

The data shown in Table 3-18 yields the following:

	Job Referrals	Training Referrals	Total Referrals	Ratio: Total Referrals to Total Clients Referred
Experimental	844 (63.8)	479 (36.2)	1323	1.12
Control	346 (80.3)	85 (19.7)	431	1.05

It is interesting to note that the percentage distribution of referral transactions by type is approximately the same as the percent of clients whose current status code represents a referral to a job or a training program as shown in Exhibit 3-3. Probably this is due to the low ratio of referral transactions to individuals referred; i.e., most clients who were referred at least once to a job or training opening were only referred this one time.

Therefore, even though there are certain unresolved differences between the data presented in the ADP-PDS Inc. final report and the data presented by Ultrasystems in this report, the differences are not very substantial.

ADP-PDS Inc. reached the following conclusions or findings as shown in Exhibits 3-4 and 3-5. The gist of these statements is that through the use of the CJMS clients have a greater chance of being referred and that when referred have a greater probability of being accepted in either a job or a training program. The data we presented in Tables 3-9 through 3-16 and the data presented in Exhibits 3-1 through 3-3 do show that a larger percent of control group clients were in closed-not referred status (64.7% of the control group as compared to 45.6% of the experimental as shown in Table 3-9) and that a larger percent of the experimental group clients were accepted into jobs and/or training as compared to the control group (25.6% compared to 20.7%). One should note that there were a considerable number of experimental group clients still in pending status. If one removed all pending referral clients from both groups, one would find that the percent of clients in closed-not referred status would be 50.1% for the experimental group and 64.8% for the control, and the accepted into jobs or training would be 28.1% for experimental and 20.7% for control.

Exhibit 3-4

Table 1-4 SUMMARY OF CJMS PERFORMANCE BY AGENCY-CONTROL (CTRL) vs. EXPERIMENTAL (EXP) GROUPS shows the following general characteristics:

a) In all cases the Total Referred as a percentage of Total Processed (item 2) was higher for the Experimental than for the Control Groups. Even for BICC it is expected that a significant portion of those Pending Referral (item 3) will transfer to the Referral category. The range of absolute increase in percent Referred (except for BICC as noted above) is from 2% to 26%; the range of relative increase in percent referred (Exp. % ÷ Control %) is from 3% to 122%.

b) A corrollary to a) above is the universal reduction in the percentage of clients closed, not referred (item 4). The most frustrating and perhaps damaging effect of many programs for the disadvantaged is that the individual gets no help at all and is again rejected. Through the use of the CJMS the group in this category was lower in every case for the Experimental Groups than the Control Groups. The range of absolute decrease in Closed not Referred is 10% to 38%. The range of relative decrease ((1- Exp% ÷ Control %) x 100) is 12% to 59%.

c) Since the primary effort in this project was to place individuals into jobs or training programs leading to jobs the Accepted category (item 5) becomes most important. In every instance the Experimental Groups, using the CJMS, showed an increase in the Accepted category over the Control Groups. The range of absolute increase in the percent Accepted category is from 4% to 22%. The range of relative increase is from 31% to 94%. This is accomplished without significatly affecting the category of those referred but not accepted (item 6).

"In summary, the use of the CJMS in this experiment has resulted in increased percentages of people referred and accepted by employers without a significant negative or positive effect on those who were referred but not accepted. It has also produced smaller percentages of people closed, not referred; that is fewer people were not helped at all."

Note: Table 1-4 is shown as Exhibit 3-1.

Exhibit 3-5

Table 1-5 SUMMARY OF CJMS PERFORMANCE BY AGENCY AS A FUCTION OF TOTAL REFERRED is presented here to be consistent with prior PDS progress reports. The data, however, is more significant when evaluated as in Table 1-4. As a prime example of this, reference is made to the Atlantic City data in Table 1-5. The percent of the Control Group Accepted is 93% while for the Experimental Group Accepted it is 83%; an apparent absolute decrease of 10%. However, when it is recognized that this is really 93% of 18% Referred for the Control Group vs. 83% of 40% Referred for the Experimental Group the true difference is clear. The Experimental Group is outperforming the Control Group by almost two to one.

Note: Table 1-5 is shown as Exhibit 3-2.

"The importance of the summary data presented in Table 4.1 is that there is a significantly larger percentage, 18%, of applicants in the Control Group who were closed without having been referred either to jobs or to training leading to jobs. In all previous reports, the relatively high percentage of individuals "pending referral" did not allow drawing a difinite conclusion from this portion of the data. In this report, the "pending referral" percentage for the Control Group is 0% which means that this category can no longer influence, in a negative way, the "total referred" category. This positive trend, reflected in all previous reports and now definitely indicated, signifies that those applicants processed by the CJMS are more likely to be referred to either a job or training leading to a job as opposed to those processed without benefit of the CJMS."

Note: Table 4-1 is shown as Exhibit 3-3.

The major issues, in Ultrasystems' opinion, in interpreting these numbers are:

1) How were the control group clients selected?

2) What are the characteristics of these two groups in relationship to both the agency services where they applied and the job or training openings available to these agencies?

3) What were the operational procedures associated with the selection of clients to be given SICLs?

4) How did the agencies use the CJMS?

5) What were the CJMS scores associated with the experimental group clients and the referrals made on their behalf?

It is not possible from the information that Ultrasystems obtained about the New Jersey experiment to definitively answer these questions. It is very important, however, that one understand the impact that these issues have on the possible interpretation of the data. Ultrasystems believes it knows enough about these issues so that there is serious doubt as to the validity of the data and especially as to its interpretation. The following discussion will briefly review what we learned regarding these issues.

Issue 1: Selection of Control Group Clients

The original design for the selection of the control groups based on time phasing the use of the CJMS has already been discussed. The actual implementation of the experiment did not adhere to this design and the control group clients were obtained by sampling the agency files. The exact manner in which this sampling was done is not definitively known. We do know, however, that the entire control group to be used for the BICC agency was drawn from another agency. This group comprises 25.2% of the total control group and, has been shown, is, statistically, significantly different in demographic characteristics from the BICC experimental group. Since the intent of the control (or comparison) group is essentially to provide a means for assessing the relative effectiveness of the use of the CJMS, it is important that for all practical purposes the two groups differ only in the services provided because of the use of the CJMS. Drawing a control group from another agency introduces the issue of agency differences independent of the use or non-use of the CJMS.

The entire control group for TOPS was drawn from this agency's first training program. This training program had begun prior to the beginning of the experiment. Once the experiment began, all referrals to TOPS were given SICLs. The TOPS clients actually consist of two distinct groups, i.e., those who are enrolled in TOPS because they were referred to the training program by the local Model Cities or CEP programs, and those who more or less applied on their own accord. The Model Cities and CEP referrals had to be accepted unless TOPS could convince the CEP to withdraw the referral, an event which the TOPS staff could not remember happening. This mixture applies to both the experimental and control groups. The data received showed that 20.5% of the experimental group and 30.8% of the control group consisted of referrals from these agencies.[1] The experimental group consisted of 190 individuals who came in on their own or were referred by friends (67.1%), whereas for the control group there were 49 such cases (45.8%). Thus, not only is there a distinct difference in the use of these two groups for comparative purposes because of the issues of the time in which they were referred and enrolled (at the start of operations and after one year of experience and exposure) but in their composition as regards the manner in which they arrived at TOPS and were then screened for training.

The manner in which the control group clients from the other agencies were selected is not known. The sampling methodology used at the Vocational Rehabilitation (VR) agencies is a serious issue since the clients accepted as cases by these agencies can have a wide range of physical or mental handicaps. The data shown in Tables 3-4, 3-5, and 3-6 indicates that there is reason to believe that there were significant differences in the physical handicaps of the experimental and control groups from these agencies. In addition, the VR agencies operate on a caseload system. In ADP-PDS's first progress report, it was stated the control group sampling would be done on a random basis by simply pulling from each agency's counselor files in order to insure that there was a general cross section of counselor activities represented. The progress report stated that "thus no individual counselor could bias the results obtained." No mention was made as to how this would relate to the eventual counselor distribution of the experimental group and no mention was made as to the issue of physical and mental handicaps and counselor specialization in such categories. The examination of the data received shows that the counselor distribution of experimental and control group caseloads per agency was not uniform and that in certain agencies one, two, or three counselors account for a large percentage of one of the groups and not the other. For example, in the Atlantic City Vocational Rehabilitation agencies (Numbers 2 and 3 on Table 3-1), there were three counselors who accounted for 35.4% of the experimental group and 22.5% of the control group. There were three other counselors who accounted for 35.7% of the control group and 18.9% of the experimental group. In the New Brunswick data base, there is one counselor who accounted for 27.2% of the experimental group and 0.0% of the control group. There were four other counselors who accounted for 52.0% of the experimental group and 38.8% of the control group. In Perth Amboy, the results were more balanced with three counselors accounting for 70.3% of the experimental group and 75.6% of the control. Even here, however, there was one counselor (of the three) who accounted for 24.9% of the experimental group and 38.2% of the control group.

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[1] These percentages are based on the data unadjusted for the cases with missing values. For the experimental group, there were 28 cases with missing values (9.9%) and for the control group there were 20 cases or 18.7% of the total.

Another facet of the control group selection has to do with the services provided by these agencies. This will be discussed in the next issue, but it should be mentioned here that people who are currently employed are served by the Vocational Rehabilitation agencies with regard to their handicaps. While it is not definite that these agencies might not try to obtain a different job for these individuals, they represent a different type of client than the unemployed. The data received indicates that 100 of the 673 control group clients from the four VR-associated agencies were employed at the time they were accepted as cases by these agencies. Only two of the 680 experimental group clients were employed at the time of acceptance.

When one infers from the data that there is a difference, due to the use of the CJMS, in the percent of clients closed-not referred, one should be very careful in including clients who may not have been referred because they were already working.

Issue 2: Characteristics of Experimental and Control Groups in Relationship to Agency Services and Job or Training Openings Available

It is important in doing comparative analyses of agency performance, between two groups of clients, that one understand what services were being provided these clients by the agencies and what was the relationship between the clients and the labor market. As an example, the Vocational Rehabilitation agencies will provide services to people who are already working or who will not work because of family conditions. In the latter case, services might be provided one member of a household so that another member can go to work instead of having to attend the other because of their handicap. The agency might successfully rehabilitate this client in the sense that the person can be left alone while the other family member goes to work. The client would not be referred to a job or a training program. In addition, the services provided by these agencies via rehabilitation, vocational, and/or language training often were aimed at assisting the client in overcoming barriers to employment and that the final result of obtaining a job might rest more with the client than with the agency. All of these agencies were similar in one regard; they depended almost exclusively on the actions of the individual staff members to solicit job openings. There were differences in the degree to which individual agencies and individual agency staff were able to do this. The characteristics of the clients, in relationship to the labor market and to the labor market available to the counselor, could be and probably is a large factor in determining the eventual outcome.

It is impossible to determine from the available data what these relationships were and how they compared between the two groups. It is Ultrasystems' opinion that the combination of the selection of control group clients and the points raised above are serious considerations to be applied to inferences to be drawn from the outcome data that is available. One could contend that the differences in outcome percentages indicate that the use of the CJMS assists the counselor in such a way that they can better overcome the obstacles to employment. In order to make such a judgment, one really needs to know that there wasn't a significant difference in the level of obstacles to be overcome. Since the data does not enable one to ascertain this, and since there is at least some evidence that it wasn't true, the inferences cannot stand as is.

There is one other aspect that is troublesome. Ultrasystems was told by the Vocational Rehabilitation agencies that cases were not closed by the agency until the client was successfully rehabilitated. Exactly what this means is not clear. We do know that if a client "disappears" or "refuses to continue" the case will be closed. We also know that cases are considered successfully completed without the client obtaining a job either because the client already had a job or because obtaining a job was never in the plan developed. How this relates to the large percentage who were closed-not referred and who were referred but not accepted is not clear. The inference made by ADP-PDS indicates that this is it, that the agency did not successfully complete its rehabilitation plan. This appears to Ultrasystems to be a contradiction with what we were told and that closing a case with no referrals would be a reflection of the client's "disappearance" or that the rehabilitation plan did not envision such actions.

Issue 3: Selection of Clients for the Experimental Group

This issue is similar to the first one discussed. The experimental design called for a time-phased usage of the CJMS based on agency quotas and on the administration of the SICLs to all clients applying at the agency who meet both the agency criteria and the CJMS criteria for placement. The control group clients were to be those who met the agency criteria when the CJMS was not being used. The meaning of agency and CJMS criteria for placement had, to Ultrasystems' knowledge, never been defined. Each of the agencies had some criteria. These included:

1) screening out clients who did not appear to be reasonably serious or motivated

2) rules governing the handicaps and income of clients who were eligible for services

3) contractual arrangements whereby clients referred by certain agencies would be accepted.

The CJMS had certain criteria set forth. For one, the client had to possess a certain reading level to take the SICL's without resorting to oral administration. Once the clients were administered the SICL's, the resultant scores were to govern the referral process. To be referred to a job, the client was to have a minimum adjustment index of +.25 and a minimum match index of +.50.

As has been discussed, the time-phased quota approach was not followed. Two of the agencies, BICC and TOPS, administered SICL's to all clients over the period of the experiment. One other agency, FOCUS, left it up to the client to decide. The manner in which the other agencies selected clients is not very clear. The fact that it is not clear is a serious issue. Section 2 of this volume of the final report discussed this issue but did not contain any definitive statements on how the selection was actually done. The possibility that counselors were screening applicants for the administration of SICL's, based on some criteria, is a serious one in interpreting the eventual outcomes. The fact that since oral administration of the SICL's is a very time-consuming process (and would not be and was not done in most instances because of the time involved) implies that care must be taken in selecting a control group because the experimental group will exclude people with low reading ability.

Issue 4: How did the agencies use the CJMS?

This is actually the major issue in light of the causal inferences drawn by ADP-PDS from the data. This may sound awfully simplistic but to infer that the differences in the measures are due to the client taking the SICL's is obviously unsound. The key to the causality is in the use of the system's scores in assisting the counselor in serving the client. The real key issue is measuring the difference between the services (actions) and their outcomes that were made on behalf of a client with and without the use of the CJMS. The experiment could have been at least partially run without ever making the CJMS results known and then the resultant services could have been analyzed vis-a-vis the CJMS scores. This, of course, eliminates the effect that the CJMS would have on the services provided but does provide a measure of the relationship between the services that a counselor would provide without the system and what the system would indicate. In any case, to infer causality implies that the system was being used to at least assist in the referral to job or training process. There is, in Ultrasystems' opinion, some question as to what extent this really occurred. For instance, several of the agencies utilized aptitude, interest and psychological tests in addition to the Cleff system. The Perth Amboy agency is, in fact, a Diagnostic and Employability Center and utilized, in addition to the CJMS, the Singer/Graflex vocational (simulated work setting) evaluation system and written tests such as the Able, the California I and II. Of course, the use of tests developed to assess client aptitudes and interests is part of what the experiment referred to as "the traditional placement method." The use of multiple assessment techniques by agencies seeking to serve people with serious physical and mental handicaps is reasonably standard. How then was the CJMS used; i.e., what part did the CJMS play in the rehabilitation plan developed for these clients and the services provided? Were, in fact, all the clients in the two groups from each agency given all the same tests? Our understanding is that this was not so. Therefore, in addition to the use of the CJMS, there might well be differences between the two groups in the assessment techniques utilized.

The TOPS agency used the CJMS in addition to the Metropolitan Achievement Test. Clients were screened, based on the results of the CJMS, the test and the counselor's interview. Some clients were accepted into training based on the results of this screening; others were accepted no matter what the results. The CJMS was used to assess clients' experiences and preferences in clerical-related dimensions. Clients were not referred by TOPS to a training program; i.e., the clients referred and accepted by TOPS are in reality clients accepted by TOPS. Thus this is not really a measure of referral to training success. Closed-Not Referred includes those people that were not accepted by TOPS for training. In fact, the data presented by ADP-PDS and by us is misleading as to the TOPS control group. A report prepared by TOPS regarding their first training classes (and attached to ADP's second progress report) indicates that, in fact, 68 trainees were enrolled. Eleven of these dropped out during the semester, and twelve terminated during the job placement phase. The reasons for these terminations were given by TOPS. These included moving from the area, child care problems, health, including pregnancy, death and illness in the family and personal difficulties. TOPS listed four people as terminating because after exposure to clerical work on the job through placement they decided against it. In addition, not all those placed by TOPS from this group were placed into jobs related to their training; i.e., into clerical-related jobs. What the corresponding numbers are for the experimental group is not known.

Thus the reasons for terminations go beyond the factors considered by the CJMS and the specific mention of the four students who felt clerical work was not for them indicates that prior to the use of the CJMS the screening being done was "not that bad." The turning around of the interpretation of referred to training and accepted for TOPS is misleading. TOPS was not referring anyone to training. They were screening people for training. The fact that there were 68 people enrolled in the control group training is distinctly different than the data we received which indicates that 15 accepted training (based on the status code) and that 10 out of 40 training referrals accepted same. Therefore, the CJMS was being used in screening clients for acceptance and that the resultant success of the services provided TOPS were considerably influenced by a myriad of other factors. Judging the success of the use of the CJMS for TOPS, based on those accepted into training, is misleading. The training program runs for several months and in that time considerable other information about each trainee is obtained and personal relationships are established. All this is used in the eventual placement process. It is our understanding that the Cleff system was not used in the placement process. No jobs were profiled by TOPS. The eventual placement of their trainees was done in essentially the standard manner. It is a distinct possibility that higher placement rates for the experimental group clients could have been achieved, not because they were better suited for clerical training as measured by the CJMS, but because the staff had gained valuable experience in screening on other factors, assisting with the client's personal situations and establishing better ties to employers. In addition, another report prepared by TOPS indicated that 32 OJT slots had been made available to them for their second semester clients.

The discussion given in Section 2 of this volume of the final report discussed the issue of score interpretation being done by ADP-PDS for FOCUS. It is Ultrasystems' opinion that the staff of this agency never really understood the CJMS and the interpretation of its scores.

It should also be mentioned that TOPS was not the only agency which provided training to its clients. BICC, FOCUS and Perth Amboy also conducted their own training programs. Thus, again, the outcome measures related to referred and accepted into training can be misleading.

Issue 5: CJMS Scores

The ADP-PDS final status report never mentions the issue of the scores associated with the clients and their job or training referrals. It assumes, apparently, that the basic criteria pertaining to the minimum levels of client adjustment and match indices were followed. Ultrasystems does not believe this assumption is valid. In addition, the question of how the CJMS job or training match score was determined when there was only one agency that used JOCL's is never addressed. Apparently, the inference is that the cluster scores were used. How these cluster scores were translated into actual jobs or training matches is not clear. It is Ultrasystems' opinion, based on our interviews, that except for BICC this was not really done. The CJMS client scores were utilized to assist in assessing the client's preferences and experiences and this assessment was then utilized along with many other factors in the job or training referral process.

3.3.1 Summary of the Review of the ADP-PDS Final Status Report

The above discussion all leads to Ultrasystems' basic conclusion that the interpretations drawn by ADP-PDS, Inc., based on the data presented about the comparative effectiveness of the CJMS and traditional agency placement methods cannot be justified by the data. It is our opinion that the data is not only incomplete and in many instances probably incorrect, but that the two client groups cannot be compared. It is also our opinion, therefore, that whatever the true measures of referral success were, the differences would be attributable to the differences in (1) the clients themselves; (2) their relationship to the labor market; and (3) the services they were provided independent of the use of the CJMS.

It is no easy task to execute a comparative experiment of this sort. However, it is Ultrasystems' opinion that far too many issues were not dealt with or were ignored in the execution of this experiment. It is also our opinion that structuring an experiment to assess the comparative placement performance of the Cleff system compared to "traditional placement methods" is missing the point of the intent behind the CJMS. The issue is in the appropriateness of the match and not in how many hires one can obtain. The volume of placements depends upon many more factors than the CJMS deals with. The CJMS is supposed to provide information unique to each individual. The information it supplies compared with the alternatives available (i.e., the jobs or training programs available) can constrain placement performance unless the appropriate job or training program can be obtained. One should not lose sight of the fact that the CJMS does not explicitly include other factors associated with a successful or appropriate referral and that it does not directly measure aptitudes or skills. The intent behind the system is to assist in selecting the more appropriate referrals and to avoid making incorrect choices. This is a far cry from the issues involved in increasing placement volume. Ultrasystems is cognizant of the argument that if an agency can provide qualified, above-average workers (as measured by perforance and retention) for the jobs they are given, that this could lead to greater use of their services. This is a long-term issue; i.e., it takes time to establish these credentials. There is no evidence at all to suggest that the New Jersey experiment led to such a result in the time it was operated.

4.0 ORGANIZATION AND OPERATION OF THE SER/CLEFF EXPERIMENT

The SER/Cleff experiment was substantially different in its objectives than the New Jersey experiment. The SER experiment was undertaken with the basic objective of obtaining data to analyze the relationship between the Cleff client-job match scores and the client's eventual retention.

The basic characteristics of the SER/Cleff experiment were:

1) The experiment was aimed solely at obtaining the data needed to analyze the relationship between the CJMS scores and the subsequent retention of the person on the job.

2) The experiment was conducted by Ultrasystems in conjunction with four SER project offices in California, located in Los Angeles, San Diego, San Jose, and Santa Ana.

3) The experiment was not aimed at providing data to be used in a comparative analysis of referral, placement, and post-placement performance between a CJMS client group and a non-CJMS client group.

4) The experiment did not require that the CJMS be used by the SER agency staff in assessing clients for enrollment in training and in the referral to job process.

5) In conjunction with (4) above, no minimum client adjustment or job-match indice scores were established.

6) The experiment obtained job profiles, using the JOCL, after the client who had taken the SICLs was placed. No effort was made to obtain JOCLs for use in the referral process, i.e., JOCLs of open job orders.

7) The experiment was conducted with the objective of administering SICLs to all SER clients applying at the agency or presently enrolled in training over a 4-month time period (March through June 1973). Clients would then be included in the followup data base as they were hired until a total of 150 clients was achieved.

8) Retention followup would be done solely through employer contact. Clients were not to be contacted.

9) Retention followup was done at four time points, i.e., December 31, 1973, February 28, 1974, May 31, 1974, and December 10, 1974.

10) The administration of the SICLs and the processing of them via the CJMS was the responsibility of Ultrasystems. In implementing this aspect of the experiment, a person was hired by each of the four SER offices whose only responsibilities were associated with the experiment. This person was employed by Ultrasystems.

11) The obtaining of the job profiles was Ultrasystems' responsibility.

12) The CJMS processing aspects of the experiment were set up as if the system was actually being used. The client profiles and cluster matches were available at each office on the day following the administration of the SICL. Communication of input and output data between the SER offices and Ultrasystems' computer facility was done via facsimile equipment.

The remainder of this section will discuss some of the basic characteristics in more detail. Every point listed above will not be exhaustively discussed. The discussion to follow will concentrate on what were, in Ultrasystems' opinion, the more important aspects of the experiment. The activity and retention data associated with the experiment will be discussed in Section 5.

4.1 BRIEF DESCRIPTION OF THE SER OFFICES AND AGENCY OPERATIONS

In December of 1972, Ultrasystems contacted the National Office of Jobs for Progress, Inc. (Operation SER) to discuss the possibility that they, through their field offices, would participate in an experiment using the Cleff Job Matching System. As has been discussed earlier in this report, it was at this time that the Office of Economic Opportuhity was reviewing the scope of the planned evaluation of the Cleff experiment in New Jersey. The idea of starting another experiment with a narrower set of objectives had been proposed by Ultrasystems and was being reviewed by OEO. OEO instructed Ultrasystems to begin the process of finding an organization, involved in job placement, that would be willing to participate in the experiment. The initial discussions with the SER

National Office led to individual discussions with the Project Directors of four SER offices in California. The four Project Directors and the National Office all agreed to participate. The initial planning for the experiment began after this agreement was obtained and was presented to OEO in January of 1973. The planned approach was accepted by OEO and Ultrasystems' original contract was modified to reflect this new task.

Ultrasystems clearly stated to SER that the experiment was aimed solely at obtaining data that could be used to assess the effectiveness of the Cleff Job Matching System. Ultrasystems made it clear that it could not and would not vouch for the system's validity in assisting SER staff in the job referral process. SER was interested in the experiment because they felt a strong need for better tools in executing their job placement function. The SER offices provide a wide range of services, all geared toward the eventual placement of the person in a job. The SER offices carefully screen applicants for enrollment in the training programs that they conduct. These training programs include the following types (the definitions are taken from the SER Management Information System (MIS) Training Manual):

a) JPC -- Job Preparation Course. A job-related world-of-work program designed to prepare the enrollee to know how to seek, keep, and exit from employment.

b) ESL -- English As a Second Language. A language training class designed to assist the Spanish-speaking monolinguals to learn a survival job-related English that will prepare them for meaningful employment.

c) AAE (GED) -- Advanced Adult Education (General Education Development). A job-related course in advanced basic education designed to prepare the enrollee to enter higher skilled jobs and/or vocations. Enrollees whose functional education level is above the eighth grade will be considered candidates for the AAE class.

d) ABE (Adult Basic Education). A course in basic education designed to prepare the enrollee to meet job-related general education prerequisites to certain jobs and/or vocations. Enrollees who function at the fifth grade level to the eighth grade will be considered candidates for the ABE class.

e) OJT (On-the-Job Training). The enrollee is being trained on the job by a private or public employer at his place of business. The employer is reimbursed for the cost of *training by SER;* the training is done under contract for specific purposes and the employer is firmly committed to retain the employee on a permanent basis upon completion of the OJT contract.

f) Vocation Training. A program intended to provide vocational education and workshop training in clerical, service, semi-skilled to skilled occupations by an instructor.

SER also provides supportive services (legal, medical, transportation, and child care assistance), and enrollees in the SER program are paid a stipend (from MDTA funds). Applicants to SER are screened for enrollment in one or more of the training programs. The applicant screening process is called A&O (Assessment and Observation). The screening process is to last no more than three days and "is designed to facilitate the selection of those enrollees who are most likely to succeed." (Quote taken from the SER MIS Manual.) As part of this screening process, one or more tests are administered. Generally, the "Wide Range Achievement Test" (copyrighted 1965 by Guidance Associates of Delaware, Inc.) was used. Other tests were also used. A sample listing of these follows:

- SRA -- Arithmetic Index
- South-Western Publishing Company--Inventory Test--Business Mathematics for Colleges
- Guidance Testing Associates--Test of Reading (R-2-DE) and the Spanish version (Pruba De Lectura).
- SRA--Pictorial Reasoning Test
- USES--GATB (administered by the USES)

Applicants accepted by SER have an Employability Development Plan developed. As stated in the MIS Manual, this is "a plan of action developed by the client, the counselor and the team (Employability Development team consisting of an interviewer, job developer, and sometimes instructors in addition to the client and the counselor), which states in clear, concise terms the vocational goals, qualifications needed for goals, employment opportunities, employment barriers needing attention, and the steps necessary to implement the plan. This includes training, remedial services, intermediate placement, and all supportive services necessary to implement the plan and enable the individual to enter a satisfactory job."

The primary reason why Operation SER was willing to participate in the experiment was their dissatisfaction with the tests utilized in the screening of applicants. This dissatisfaction was based on their feeling that most of the tests had ethnic biases and that they (the tests) did not seem to provide much assistance in the job selection/identification process. It was the latter point that accounted for their willingness to participate in the Cleff experiment.

As the above description indicates, the operation of the SER field offices was in many ways similar to the operations of WIN and MDTA programs. At least the terminology and structure of their operations is similar. SER is, however, devoted to providing training, education, and placement opportunities to the Spanish-speaking American community. Whereas all enrollees of SER are not Spanish speaking, the vast majority are. The four offices that participated in the experiment were all very similar to each other in their operations. There were differences, such as the outstationing of an ES staff person with the Job Bank listing in the Santa Ana office. In their basic operational structure, however, the four offices were essentially identical. In addition, the National SER Office imposes strict operational procedures regarding the completion of forms used to document and track services provided clients.

This Management Information System is itself similar to the WIN and MDTA reporting systems (and in today's manpower environment, it is similar to the CETA MIS). These similarities in operations and reporting greatly facilitated the design of this experiment as compared to the New Jersey experiment with its vastly different agencies.

Before turning our attention to the description of the experiment itself, there are three other subjects that are worthy of mention. The first of these has to do with the rules established by SER for the conduct of the experiment. The SER offices all made it clear that they did not have the resources to administer SICLs. Therefore, as part of the experiment, Ultrasystems employed a person of SER's choosing in each of the participating offices. These people were responsible for administering SICLs and tracking the clients. This idea of having a person in each office who was responsible for the administration of the system was in keeping with one of Ultrasystems' findings from the New Jersey experiment.

The second subject has to do with an aspect of SER operations that was not discussed earlier. Whereas the major part of SER's operations are involved with training and placement of applicants enrolled in their programs, they also provide direct job referral services to people not enrolled. In the terminology utilized, if a job referral made for an applicant not enrolled in SER programs results in a placement, then this is referred to as a direct job placement, or a direct job entry. Correspondingly, enrollees placed into jobs are referred to as indirect job entries. In executing the experiment, no criteria were established regarding these two types of job placements.

The final subject has to do with the history of Operation SER. In June 1966, two Spanish-speaking national organizations, LULAC (League of United Latin American Citizens) and the American G.I. Forum joined to form Jobs for Progress, Inc. The program of providing training, education, and placement services to Spanish-speaking Americans established by Jobs for Progress was given the name "Operation SER." SER, the Spanish verb for "to be" is used as an acronym for "Service, Employment, Redevelopment." SER was funded by the United States Department of Labor, the Office of Economic Opportunity, and the Department of Health, Education, and Welfare. At the time of the experiment, SER had field offices in 13 States, with the majority of these offices located in the Southwestern United States, i.e, California, Arizona, New Mexico, Texas, and Colorado.

4.2 IMPLEMENTATION OF THE SER/CLEFF EXPERIMENT

The implementation of the SER/Cleff experiment consisted of six elements or areas of activity, as follows:

- Training in the administration and use of the CJMS
- Administration of SICLs to SER applicants and enrollees and the recording of placements made for these people
- Processing of the SICL and the establishment of the client part of the experimental data base
- Administration of JOCLs with the employers with whom formerly SICL'd SER clients were placed
- Tracking the retention of the clients who completed SICLs and whose jobs were JOCL'd
- Analysis of the data

It is important to keep in mind that the experiment only sought to obtain the data needed to analyze the relationships between the Cleff system's person and job profiles and the eventual retention of the person on the job. Therefore, the real purpose of the participation of the four SER offices was to provide people who would complete the SICLs and who would then be placed into jobs.

The experiment was set up with the idea of administering SICLs to every SER applicant and enrollee, at each office, over the four-month time period. The rational behind this was to obtain as large an experimental client group as possible in the shortest period of time. Our intent was to minimize the time span associated with the hire dates of our retention followup sample. In addition, it was hoped that this would help assure that our followup sample was broadly representative of the clients who come to SER. This was not done for any rigorous statistical purpose, since we were not setting out to do a comparative analysis of the retention of our experimental group and some control group, i.e., a sample of SER clients who did not take the SICLs. The simple fact that our experimental group consisted of SER applicants and enrollees meant that a priori we would have a sample of people who were predominantly Spanish speaking. In essence, we were doing a first level analysis of the validity of the CJMS in terms of its ability to predict the relative duration of employment. This first level analysis would leave many questions unanswered. In the end result, the experiment was not implemented so that every SER applicant and enrollee (over the four-month time period) took the SICLs. As will be discussed in the next section, 571 people took one or both SICLs. Exactly what proportion this is of all the people who could have taken an SICL is not known. The final followup sample of 142 people were hired over a 30-week span. The last hire was made on October 1, 1973. This means that the minimum possible length of employment that was tracked could be approximately 14 months and the longest approximately 21.

The first five of the six experimental areas of activity will be discussed in the following subsections. Section 5 will present the analysis of the data obtained.

4.2.1 Training in the Administration and Use of the CJMS

The initial training in the background, methodology, and use of the CJMS was provided by Mr. Michael Youchah of ADP-PDS Inc. This initial training session was held at each of the four SER offices and was attended by the staff of these offices. More intensive training was provided each of the people hired by Ultrasystems who were responsible for the administration of the SICLs in each office. In addition, Mr. Ron Harris, who was a counselor at BICC, was hired for the duration of the experimental activities that took place in the SER offices. Mr. Harris devoted full time to assisting the SER office staff members, and especially the SICL administrators, in the operation of the CJMS.

Ultrasystems assembled a training manual for use of the SER office staff. This manual contained the instructional material prepared by Dr. Cleff (see Appendix E), and in addition contained the Job Cluster Register, the SICLs and JOCL booklets, and instructions developed by Ultrasystems for inputting the checklist answers and for reading the outputs.

The most important aspect of the training was provided by Mr. Ron Harris. One of the lessons learned from the New Jersey experiment was that one-shot training in the use of the Cleff system is not sufficient. There is a definite need during the system's initial usage for continuous guidance and assistance in dealing with the administration of the checklists and interpretation of the resultant scores. Mr. Harris also trained Ultrasystems and SER staff in the administration of JOCLs.

The operation of the Cleff Job Matching System was described in Vol. I of this report. In this description, Ultrasystems pointed out that in our opinion the instructional material available regarding the administration of the checklists and interpretation of the resultant scores does not adequately cover the real-world situations that arise. In particular, the issue of the degree to which the checklists are completed entirely by the respondent was discussed. The approach developed by BICC during the two years in which they utilized the CJMS was that one cannot always leave the respondent completely alone after the mechanics of completing the checklist is explained. There are no general rules regarding the manner in which the administrators oversee the checklist completion process. One essentially learns from experience the best way to handle these situations. It is important to keep in mind that the checklists are not a "test" in the sense that there is a correct answer to a question. The basic issue has to do with the manner in which one deals with situations where clients (or on-the-job supervisors) cannot decide on the phrases to choose or cannot find enough phrases to complete each page. This issue was discussed earlier. Suffice it to say that the manner in which the SICLs and JOCLs were administered during this experiment reflects in large degree the approaches developed and used by BICC and taught to SER and Ultrasystems by Mr. Harris.

It should also be mentioned that there was one significant difference between the manner in which the SER/Cleff experiment administered SECLs and the approach used by BICC. In the SER/Cleff experiment, the SECL administrators were not SER counselors or interviewers. The administrators were specifically hired for this experiment. At BICC, the administrators and the counselors were the same people. AT BICC, the standard approach was to interview the client before giving the SICL. The person interviewing the client and the person administering the SICLs were often or usually the same. The SER experiment did not operate this way, since obviously interviewing applicants was not Ultrasystems' responsibility.

4.2.2 Administration of SICLs to SER Applicants and Enrollees

Earlier we discussed that aspect of the experiment dealing with the selection of applicants who would take the SICLs. Our goal was to administer SICLs to all applicants and enrollees at the SER offices over the four-month time period. This goal was not achieved. The final decision was made by either the applicant or the training program instructor. People who came to the SER offices for direct placement assistance were briefly told about the system and asked to take the SICL. They obviously could refuse. SER itself does not administer the types of tests listed earlier to all applicants. Only those applicants who want to enter one or more of the training programs are given these tests. For the people who were currently enrolled in the training programs, the approach was different. The system was briefly explained to the instructors and their cooperation was solicited. With their approval, the SICLs were given to the entire class. Usually, this was done in two separate sessions--one for each of the two booklets. In a sense, the situation is much like what occurred in the New Jersey experiment. However, there was an important difference in that the SER experiment was not designed to provide comparative placement performance data.

Once the SICLs were administered, it became the responsibility of the special Cleff administrators to track the services (and their outcomes) provided these people. The purpose obviously was to obtain the data that identified those people who were placed into jobs and the jobs they obtained. This was done by periodically reviewing the client case files maintained as part of the SER Management Information System. Ultrasystems maintained a duplicate set of files for those people who took SICLs. Once a sufficient number of people who took SICLs was placed into jobs, the tracking of the remainder of the SICL'd clients was discontinued. This occurred several months after the last SICL was administered because of the length of time that enrollees spend in training prior to placement.

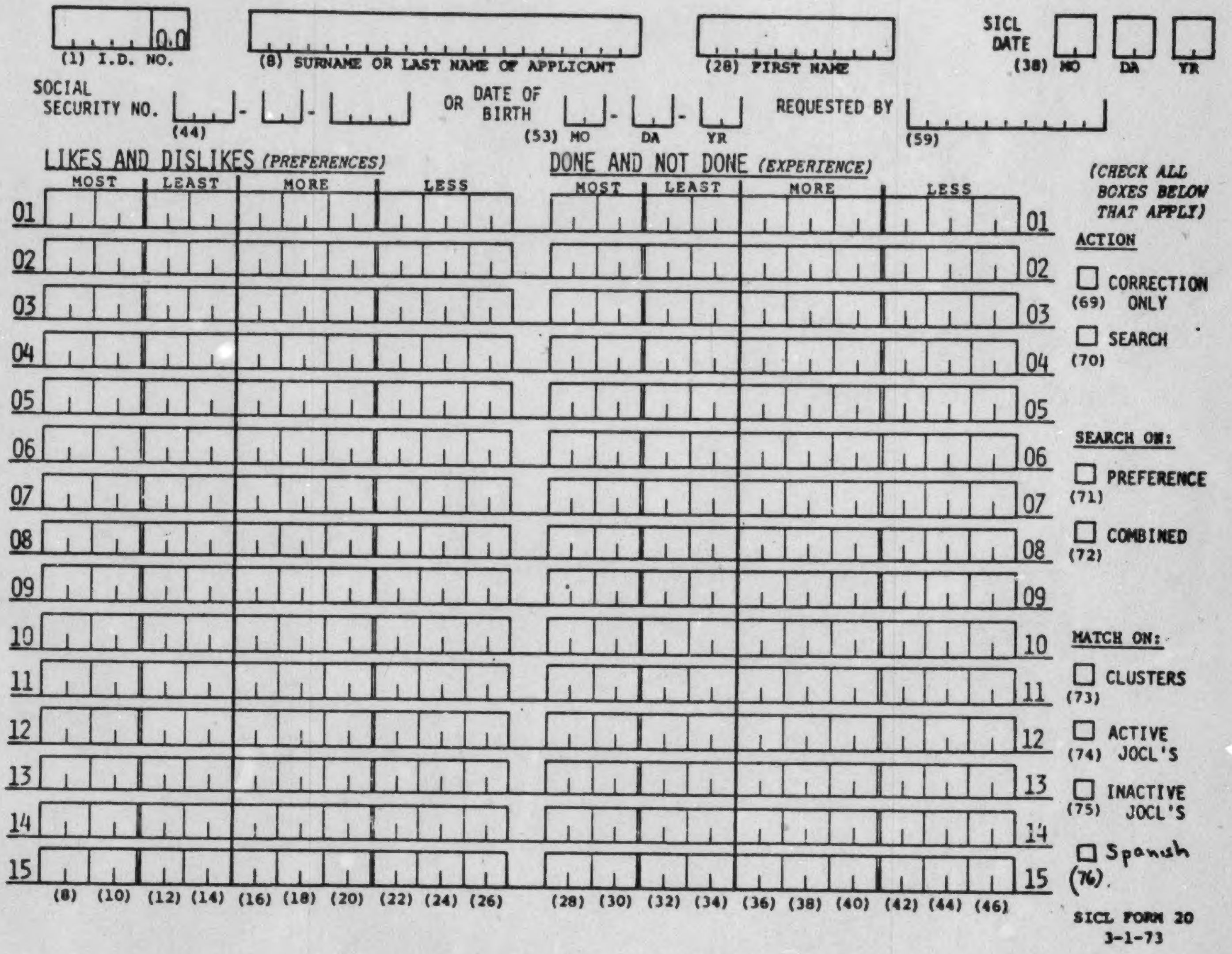
4.2.3 Processing of the SICLs

In implementing the SER experiment, Ultrasystems changed the procedures associated with the computer processing aspects of the CJMS from those utilized in the New Jersey experiment. The two most significant changes involved the incorporation of a pictorial (histogram) presentation of the client's preference and experience dimension scores and the use of facsimile equipment instead of a teletype terminal for communication with the computer. The steps involved in the SICL processing, the forms utilized, and the outputs produced will be briefly discussed below. As the discussion will indicate, the SICL processing methodology was set up as if this was a real-world situation in which the CJMS was being used to assist in the screening and referral activities of the SER offices. If the experiment had been implemented from the outset strictly as a data-gathering exercise, then there would have been no need to provide the output scores to the SER offices. This would have eliminated the need for the facsimile equipment and procedures. However, since the experiment was not implemented strictly as a data-gathering exercise, the procedures utilized reflected the requirement of SER that applicant assessment be completed within three days. Thus, the scores generated from the input SICLs were available on the day following input. The New Jersey experiment was set up to provide the scores within minutes after the raw data was input via the teletype terminal communication link to the computer (see Section 2 of Part II). At SER, there was not an absolute need for turnaround to be accomplished this quickly, since the screening process usually took place over the three-day period. As a matter of fact, our observations and staff interviews in New Jersey indicated to us that in many situations immediate turnaround is not required. Obviously, however, if one is utilizing the CJMS in an environment such as the ES, then the turnaround time becomes an important issue.

Upon completion of the SICL booklets, the phrases selected by the person are entered into the SICL input form as shown in Figure 4-1. As explained in Vol. I, the SICL booklets consist of fifteen pages, with each page containing 16 activity phrases, i.e., one for each dimension. The respondent chooses ten phrases on each page based on the rules governing this selection. The numbers of the phrases chosen are entered on the form shown in Figure 4-1 under the appropriate column headings governing the phrase selection criteria, i.e., most, least, more, and less. The respondent is identified by name, social security number, and/or birthdate. Each client was assigned a unique five-digit number, the first digit of which identified the SER agency where the respondent was applying or was enrolled. The date the SICL was taken was also entered along with the name of the SER counselor or interviewer who was in charge of serving this individual. The entries along the right-hand side of the SICL input form controlled the actions that would be taken with this input data. The first two boxes specified if the input was being submitted to correct a previous input or was a new input to be processed. The next set of boxes indicated whether the client was to be matched using only the preference score or the combined score or was to be matched in both ways (indicated by checking both boxes). The final set of entries indicated whether the match was to be made against the cluster profiles, active job profiles, inactive job profiles, or any combination of the above. The last entry, labeled Spanish on the form, indicates if the client took the Spanish version of one or both SICLs.

The SICL input form was completed by the SICL administrator at the SER office. The input form was transmitted via facsimile to Ultrasystems' keypunch facility. A log of all SICLs administered and input was kept at each SER office and at Ultrasystems. Figure 4-2 shows this SICL tally log. Each person who took the SICL booklets was identified in this tally log by assigned client number, name, social security number, and/or birthdate. The tally log also indicates whether the results were sent and received; whether the search was to be done using the preference (P) and/or the combined (C) scores and whether the match was to be made against the cluster register (C), active job profiles (AJ), or inactive job profiles (IJ). If the processing program determined that there were errors in input, then the column so marked was checked. A column for comments was also included, as were columns for tracking the capture of the required SER MIS forms (to be explained later in this section). Maintaining tally logs at both the SER office and Ultrasystems enabled positive control to be exercised over the processing of SICLs.

Figure 4-3 shows an example of the output produced for a match using the combined scores against the cluster register. The client's



(1) I.D. NO. 0.0

(8) SURNAME OR LAST NAME OF APPLICANT

(28) FIRST NAME

SICL DATE (38) MO DA YR

SOCIAL SECURITY NO. (44) ___-__-____ OR DATE OF BIRTH (53) MO - DA - YR

REQUESTED BY (59)

LIKES AND DISLIKES *(PREFERENCES)*					DONE AND NOT DONE *(EXPERIENCE)*				
	MOST	LEAST	MORE	LESS	MOST	LEAST	MORE	LESS	
01									01
02									02
03									03
04									04
05									05
06									06
07									07
08									08
09									09
10									10
11									11
12									12
13									13
14									14
15									15
	(8) (10)	(12) (14)	(16) (18) (20)	(22) (24) (26)	(28) (30)	(32) (34)	(36) (38) (40)	(42) (44) (46)	

(CHECK ALL BOXES BELOW THAT APPLY)

ACTION

☐ (69) CORRECTION ONLY

☐ (70) SEARCH

SEARCH ON:

☐ (71) PREFERENCE

☐ (72) COMBINED

MATCH ON:

☐ (73) CLUSTERS

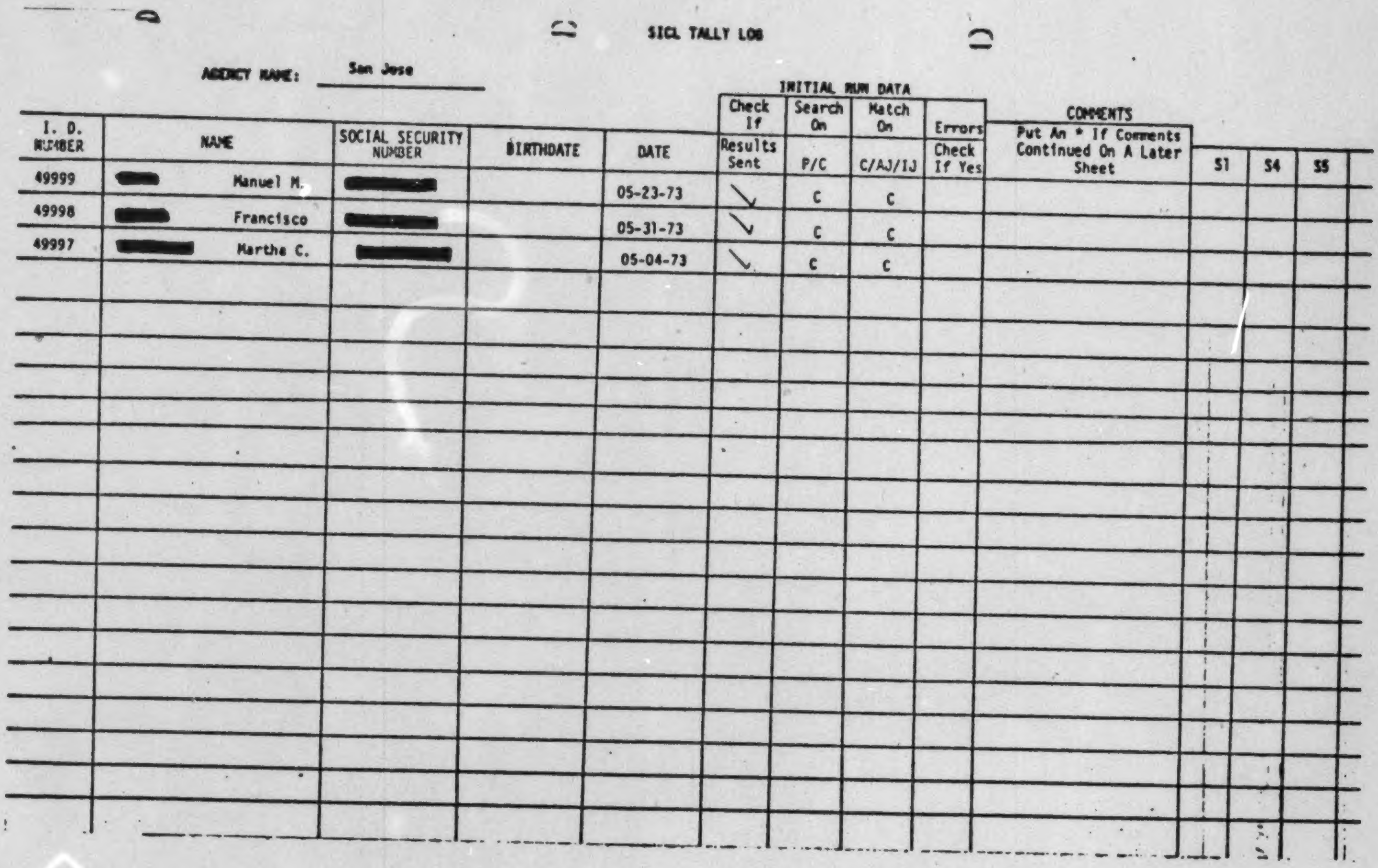
☐ (74) ACTIVE JOCL'S

☐ (75) INACTIVE JOCL'S

☐ (76) Spanish

SICL FORM 20
3-1-73

Figure 4-1. SICL Input Form

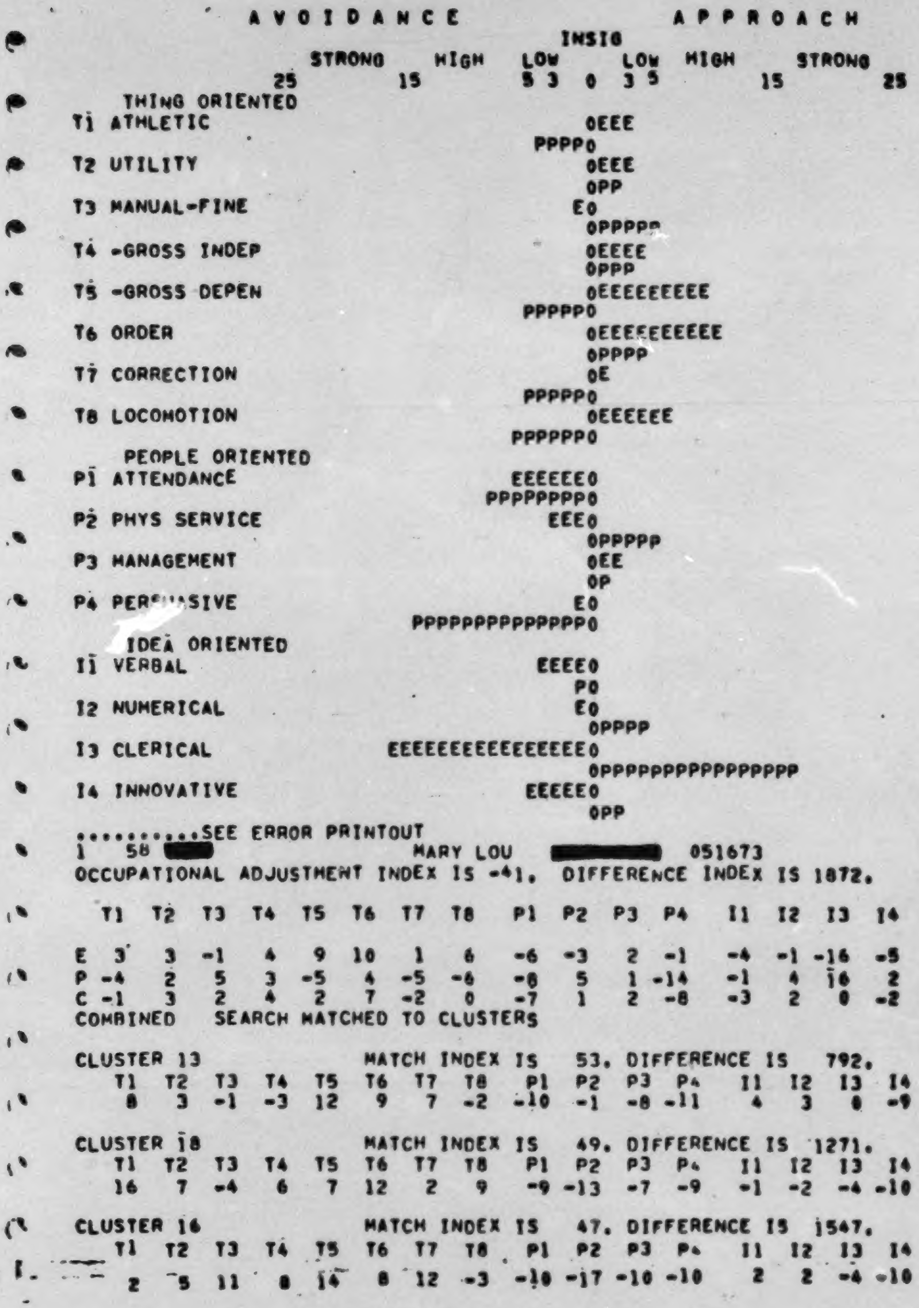


SICL TALLY LOG

AGENCY NAME: San Jose

I. D. NUMBER	NAME	SOCIAL SECURITY NUMBER	BIRTHDATE	DATE	INITIAL RUN DATA: Check If Results Sent	INITIAL RUN DATA: Search On P/C	INITIAL RUN DATA: Match On C/AJ/IJ	Errors Check If Yes	COMMENTS Put An * If Comments Continued On A Later Sheet	S1	S4	S5
49999	[redacted] Manuel M.	[redacted]		05-23-73	✓	C	C					
49998	[redacted] Francisco	[redacted]		05-31-73	✓	C	C					
49997	[redacted] Martha C.	[redacted]		05-04-73	✓	C	C					

Figure 4-2. SICL Input Tally Log



```
              A V O I D A N C E                  A P P R O A C H
                                        INSIG
                   STRONG    HIGH   LOW     LOW  HIGH     STRONG
                25         15         5 3  0  3 5        15         25
    THING ORIENTED
T1 ATHLETIC                               OEEE
                                      PPPPO
T2 UTILITY                                OEEE
                                          OPP
T3 MANUAL-FINE                           EO
                                          OPPPPP
T4 -GROSS INDEP                           OEEEE
                                          OPPP
T5 -GROSS DEPEN                           OEEEEEEEEE
                                     PPPPPO
T6 ORDER                                  OEEEEEEEEEE
                                          OPPPP
T7 CORRECTION                             OE
                                     PPPPPO
T8 LOCOMOTION                             OEEEEEE
                                    PPPPPPO
    PEOPLE ORIENTED
P1 ATTENDANCE                       EEEEEEO
                                  PPPPPPPPO
P2 PHYS SERVICE                        EEEO
                                          OPPPPP
P3 MANAGEMENT                             OEE
                                          OP
P4 PERSUASIVE                            EO
                            PPPPPPPPPPPPPPO
    IDEA ORIENTED
I1 VERBAL                              EEEEO
                                         PO
I2 NUMERICAL                             EO
                                          OPPPP
I3 CLERICAL                 EEEEEEEEEEEEEEEEO
                                          OPPPPPPPPPPPPPPPP
I4 INNOVATIVE                         EEEEEO
                                          OPP
..........SEE ERROR PRINTOUT
1   58 [redacted]                    MARY LOU   [redacted]   051673
OCCUPATIONAL ADJUSTMENT INDEX IS -41.  DIFFERENCE INDEX IS 1872.

   T1  T2  T3  T4  T5  T6  T7  T8   P1  P2  P3  P4   I1  I2  I3  I4

E  3   3  -1   4   9  10   1   6   -6  -3   2  -1   -4  -1 -16  -5
P -4   2   5   3  -5   4  -5  -6   -8   5   1 -14   -1   4  16   2
C -1   3   2   4   2   7  -2   0   -7   1   2  -8   -3   2   0  -2
COMBINED   SEARCH MATCHED TO CLUSTERS

CLUSTER 13              MATCH INDEX IS   53. DIFFERENCE IS   792.
    T1  T2  T3  T4  T5  T6  T7  T8   P1  P2  P3  P4   I1  I2  I3  I4
     8   3  -1  -3  12   9   7  -2  -10  -1  -8 -11    4   3   8  -9

CLUSTER 18              MATCH INDEX IS   49. DIFFERENCE IS  1271.
    T1  T2  T3  T4  T5  T6  T7  T8   P1  P2  P3  P4   I1  I2  I3  I4
    16   7  -4   6   7  12   2   9   -9 -13  -7  -9   -1  -2  -4 -10

CLUSTER 16              MATCH INDEX IS   47. DIFFERENCE IS  1547.
    T1  T2  T3  T4  T5  T6  T7  T8   P1  P2  P3  P4   I1  I2  I3  I4
     2   5  11   8  14   8  12  -3  -10 -17 -10 -10    2   2  -4 -10
```

Figure 4-3. Sample CJMS Output Cluster Match

```
CLUSTER 17                  MATCH INDEX IS   37. DIFFERENCE IS   969.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
   13    9   -7   -4    5   15   -3   -3    -2   -9   -4   -6     4   -2    0   -6

CLUSTER  9                  MATCH INDEX IS   36. DIFFERENCE IS   962.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
  -11   -1    7    8    4    5    9  -10    -9  -11   -1   -4     7    6    0    1

CLUSTER 15                  MATCH INDEX IS   32. DIFFERENCE IS   435.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
    5    1   -2    2   -2    6    5   -2    -5   -9   -3   -4     6    3    2   -3

CLUSTER  7                  MATCH INDEX IS   31. DIFFERENCE IS  1206.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
    2    5    3  -12    2   10    3  -11   -10    3  -11   -5     8   10    8   -5

CLUSTER 14                  MATCH INDEX IS   29. DIFFERENCE IS  1126.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
    1   -2   -2   -2   10    4   14   -2   -13  -14    0   -6     7    6    3   -4

CLUSTER  5                  MATCH INDEX IS   14. DIFFERENCE IS  1163.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
   -4   -5   11    4   -5    1   14    3    -8  -13   -4   -5     8    4   -1    0

CLUSTER  8                  MATCH INDEX IS   -2. DIFFERENCE IS  1784.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
    9    7  -11   -6   -5    6   -4   16     4  -13   -8   -3     5    6    7  -10

CLUSTER 11                  MATCH INDEX IS   -2. DIFFERENCE IS  1687.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
    0   13   -4   -9   -1    7   -5   -7     8  -15   -4   -3     8    4   14   -6

CLUSTER 12                  MATCH INDEX IS   -4. DIFFERENCE IS  1367.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
  -13    0    6   -7   -2    2    5  -10     0  -10    2   -2    12    8    9    0

CLUSTER 19                  MATCH INDEX IS   -9. DIFFERENCE IS  3140.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
  -22    0    6    0  -21   10    2  -18     7   17   -3    6     6    1    4   11

CLUSTER 10                  MATCH INDEX IS  -16. DIFFERENCE IS  1241.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
   -2    5   -9   -7   -1    8   -6   -9    10    8   -5    1     9    1    1   -4

CLUSTER  1                  MATCH INDEX IS  -23. DIFFERENCE IS  2484.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
  -16    4    8  -12   -6   -2   -2  -14     8   -7   -1    1    14   10   16   -1

CLUSTER  4                  MATCH INDEX IS  -37. DIFFERENCE IS  2023.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
   -7    3   -4  -16    2   -3    1  -12     8   -9    6    1    14    7    9    0

CLUSTER  3                  MATCH INDEX IS  -41. DIFFERENCE IS  1864.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
   -8   -3   -6  -11   -8   -4   -1   -7     5   -2   13    3    15    4    8    2

CLUSTER  6                  MATCH INDEX IS  -41. DIFFERENCE IS  2488.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
  -10    2   -6  -13   -8    5   -6  -14    14   -6    3    9    13    8    8    1

CLUSTER  2                  MATCH INDEX IS  -53. DIFFERENCE IS  3030.
   T1   T2   T3   T4   T5   T6   T7   T8    P1   P2   P3   P4    I1   I2   I3   I4
  -10   -2  -10  -13  -11   -5   -7    2     6    5    4   16    15    6    9    4
```

Figure 4-3 (continued)

individual preference and experience dimension scores are displayed in the histogram and then summarized below the client identification data. The client's occupational adjustment and difference indices are given on the line just below the client identification data. The match scores to each cluster and the cluster dimension scores are then given in descending order of the match index. Figure 4-4 shows a search using combined scores against the inactive job profiles. It is important to note that no matches against active or inactive job profiles were made during the four month period during which SICLs were given at the SER offices. As has been mentioned earlier, the completion of job profiles was done after the person who took the SICL was hired. The computer program was set up to enable one to match against job profiles, but the SER agencies only received cluster matches. The matching against the job profiles was done as part of the analysis of the data obtained.

In addition to the tally logs, client case files were maintained at the SER offices and at Ultrasystems. The client case files at the SER offices contained the following:

i) The SICL booklets completed by the client

ii) The original copy of the SICL input form

iii) A copy of the output generated

iv) A copy of the error messages (if any) generated as part of the processing and the SICL input form used to correct these errors

v) Copies of the forms completed by the SER staff and the client containing the client's socioeconomic data and the historical record of the services provided by SER and the outcomes of these services

These client case files were established and maintained by the SICL administrators working in each SER office. These files were maintained independently of the client case files established by SER.

The client case files maintained at Ultrasystems contained the following:

i) The facsimile copy of the SICL input form

ii) The original copy of the output generated

iii) The original error messages (if any) generated and the data submitted to correct these errors

iv) The keypunch cards generated from the input form

v) Keypunch cards generated by the processing program

```
              A V O I D A N C E                  A P P R O A C H
                                        INSIG
                    STRONG    HIGH   LOW     LOW  HIGH     STRONG
                25         15        5 3  0  3 5        15        25
    THING ORIENTED
T1 ATHLETIC                               0EEE
                                          0PP
T2 UTILITY                                0EEEEEEEEE
                                          0PPPPPPPP
T3 MANUAL-FINE                      EEEEEE0
                               PPPPPPPPPPP0
T4 -GROSS INDEP                     EEEEEE0
                                  PPPPPPPP0
T5 -GROSS DEPEN                    EEEEEEE0
                                 PPPPPPPPP0
T6 ORDER                                  0EEEEEEE
                                          0PPPPPP
T7 CORRECTION                            E0
                                     PPPPP0
T8 LOCOMOTION                       EEEEEE0
                                 PPPPPPPPP0
    PEOPLE ORIENTED
P1 ATTENDANCE                           EE0
                                          0PPP
P2 PHYS SERVICE                       EEEE0
                                         P0
P3 MANAGEMENT                             0EEEEEEE
                                          0PPPPPPPPPPPP
P4 PERSUASIVE                             0
                                       PPP0
    IDEA ORIENTED
I1 VERBAL                                 0EEEEEEE
                                          0PPPPPPPPPPP
I2 NUMERICAL                             E0
                                        PP0
I3 CLERICAL                             EE0
                                          0PPPP
I4 INNOVATIVE                             0EE
                                          0PP      Client Social Security Number
..........SEE ERROR PRINTOUT
1    1 [redacted]←Client Last Name JUAN B        [redacted]      032673
OCCUPATIONAL ADJUSTMENT INDEX IS  89.  DIFFERENCE INDEX IS  182.

   T1  T2  T3  T4  T5  T6  T7  T8   P1  P2  P3  P4   I1  I2  I3  I4

E   3   9  -6  -6  -7   7  -1  -6   -2  -4   7   0    7  -1  -2   2
P   2   8 -11  -8  -9   6  -5  -9    3  -1  12  -3   11  -2   4   2
C   3   9  -9  -7  -8   7  -3  -8    1  -3  10  -2    9  -2   1   2
COMBINED   SEARCH MATCHED TO INACTIVE

1013 PARKING ATTENDENT      07/25/73
40.00 HRS/WEEK   $   2.25/HOUR   GIVES OUT TICKETS AT ENTRANCE OF
PARKING LOT. ALSO PARKING LOT       CONTROLLER.
[redacted]  [redacted] EXPOSITION BLVD., LOS ANGELES, CA. 90015
CONTACT [redacted]
INACTIVE  DEVELOPED BY PORTILLO        [redacted]
                        MATCH INDEX IS   69. DIFFERENCE IS   957.
   T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
  -11   6  -6  -8  -8   0  -7 -10  14  -3  15  -7  14   9  -1   3
```

Figure 4-4. Sample CJMS Output: Job Profile Match

```
   1  16  -8 -11  -7   9  -3  -9   0  -6  -2  -9   7  10  10  -6

1005 FLOOR MESSENGER          07/17/73
40.00 HRS/WEEK   $   2.25/HOUR   MAIL MESSENGER. INCOMING/OUTGOING
MAIL IN SEVERAL DEPARTMENTS  4 1/2 DAYS A WK. DURING SUMMER
[redacted] [redacted] SO. HILL. LOS ANGELES. CA.
CONTACT [redacted]        C-=10065
INACTIVE  DEVELOPED BY REYES-PORTIL  [redacted]
                              MATCH INDEX IS   56. DIFFERENCE IS   949.
  T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
  14  12  -3 -12   0   7  -1   0   2 -14  -3  -8   9  -7   3   1

1011 SECRETARY                07/27/73
40.00 HRS/WEEK   $   2.89/HOUR   ANSWER PHONE. GREET PEOPLE. TAKE
CARE OF FILES  RESPONSIBLE FOR      INCOMING AND OUTGOING MAIL.
[redacted] [redacted] W. WASHINGTON BLVD. VENICE. CA. 90291
CONTACT [redacted]        C-=10033 C-=10036
INACTIVE  DEVELOPED BY PORTILLO     [redacted]
                              MATCH INDEX IS   54. DIFFERENCE IS  1843.
  T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
 -11  14   4  -5  -1   9   0 -20   4 -16   2 -11  16   1  17  -3

1021 FILE CLERK               09/19/73
40.00 HRS/WEEK   $   2.38/HOUR   MAINLY FILING. PULLS OUT FILES AND
DELIVERS TO VARIOUS DEPARTMENTS ON REQUEST. PUT THEM IN AS COMING
[redacted] [redacted] WILSHIRE BLVD. LOS ANGELES. CA. 90036
CONTACT [redacted]        C-=10029
INACTIVE  DEVELOPED BY PORTILLO     [redacted]
                              MATCH INDEX IS   52. DIFFERENCE IS  1161.
  T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
  -2  14  -6  -5  -1  15   1  -4   3 -15  -2  -7   5  -1  14  -9

1018 SALES CLERK              08/02/73
40.00 HRS/WEEK   $   2.25/HOUR   ASSISTS CUSTOMERS ON BUYING MEN#S
FURNISHINGS
[redacted]         [redacted] SO. BROADWAY ST. LOS ANGELES. CA.  90015
CONTACT [redacted]        C-=10003
INACTIVE  DEVELOPED BY REYES        [redacted]
                              MATCH INDEX IS   49. DIFFERENCE IS  1319.
  T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
  -3  -4 -15  -5  -9  14   3  -9   6  -5   5  13   6  14  -4  -7

1008 GENERAL CLERK            07/17/73
40.00 HRS/WEEK   $   2.97/HOUR   ANSWERS PHONE. RESPONSIBLE FOR MAIL
TYPES WORKS RIGHT ALONG WITH        SUPERVISOR. 90 DAY PROBATION
[redacted] [redacted] SANTA MONICA BLVD. SANTA MONICA. CA.
CONTACT [redacted]        C-=10037
INACTIVE  DEVELOPED BY REYES        [redacted]
                              MATCH INDEX IS   46. DIFFERENCE IS  1726.
  T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
  -8   7   1 -12  -3   5   2  -8   3 -17  -1 -15  14   7  19   6

1004 WAREHOUSE MAN            07/19/73
40.00 HRS/WEEK   $   2.50/HOUR   KEEP TRACK OF INCOMING AND OUTGOING
STOCK LEARN **S OF ALL WIG STYLES  KEEP PLACE IN ORDER + UPTODATE
[redacted] [redacted] TENNESSEE AVE. LOS ANGELES. CA.   90064
CONTACT [redacted]        C-=10021  C-=10023
INACTIVE  DEVELOPED BY PORTILLO     [redacted]
                              MATCH INDEX IS   45. DIFFERENCE IS   980.
  T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
  -6   9  -8  -4  -2   7   2  -5   1  -3  -7  -9  12   9  10  -4

1014 MACHINE OPERATOR         07/25/73
40.00 HRS/WEEK   $   2.50/HOUR   MANY AUTOMATED MACHINE OPERATIONS
FILL CAROUSEL-LIKE CARRIAGES AFTER ASSEMBLING UNITS. ROUTINE JOB
[redacted]          [redacted] SO. MAIN ST. LOS ANGELES. CA.  90015
CONTACT [redacted]        C-=10004
INACTIVE  DEVELOPED BY REYES        [redacted]
                              MATCH INDEX IS   37. DIFFERENCE IS  1001.
  T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
   0   4  -1  -3   1   7  12  -2 -12 -14   5  -4   7  -3   5  -2

JOB NUMBER 1002           MATCH INDEX IS   37. DIFFERENCE IS  1809.

JOB NUMBER 1015           MATCH INDEX IS   33. DIFFERENCE IS   950.

JOB NUMBER 1009           MATCH INDEX IS   30. DIFFERENCE IS  1980.

JOB NUMBER 1020           MATCH INDEX IS   29. DIFFERENCE IS  1647.

JOB NUMBER 1012           MATCH INDEX IS   26. DIFFERENCE IS  1729.

JOB NUMBER 1019           MATCH INDEX IS   23. DIFFERENCE IS  1530.
```

Figure 4-4 (continued)

At the conclusion of the four-month period of SICL administration, the client case files maintained at each SER office were brought to Ultrasystems.

As the file content descriptions indicate, there are three aspects of the SICL processing and client record keeping that have not been discussed. These three apsects are the error messages, the SER client tracking forms, and the keypunch cards generated by the SICL processing program. These subjects will now be discussed.

4.2.3.1 Error Checking and Error Messages

The computer program that processes the input SICL data checks the data for completeness and inconsistences before the processing is done. Specifically, the program checks the input as follows:

i) The input is checked to determine if the client can be identified. Specifically the input is checked to see if the input contains a client identification number, name, birthdate, and social security number. If there is no client identification number, the input will not be processed. In addition, if there is an identification number but no name, birthdate, or social security number, the input will not be processed. This is done to avoid problems in determining the client to whom the resultant data pertains. If the input can be processed but is missing either the birthdate or the social security number, then error messages are printed identifying these missing items, but the output is generated.

ii) The number of complete sets or groups of input phrase numbers is checked. Each of the SICL booklets contains 15 such groups (one for each of the 15 pages). The program will accept SICLs which have at least ten complete groups from each book. In addition, the program will accept SICL input where only the preference SICL was completed (or, more exactly, where at least ten complete groups from the preference SICL were completed). In addition, the program checks each group of phrase numbers to determine that there are ten phrase numbers input, that there are no duplicate phrase numbers, and that there is no phrase number greater than 16. Thus, the program checks each group of phrase numbers input, determines if there are any errors, and then determines if there are at least ten error-free groups input per booklet.

If at least ten error-free groups were not input, then the program will not process the data. If there were, say, 15 groups input but errors were detected in two of these groups (e.g., missing or duplicate phrase numbers), then the program will identify the errors but will process the input using the 13 good groups. Thus, the program will process incomplete books and will process the two books completed by a given client when the number of good groups per booklet is not equal.

The program linearly adjusts the resultant dimension scores to compensate for missing or unacceptable groups. Thus, if the client's preference dimension scores were calculated based on 14 groups, then the scores so obtained are adjusted by the ratio 15/14.

iii) The program checks the inputs given in the boxes on the right-hand side of the form; i.e., the entries which indicate what is to be done with the input data. The program checks these entries, but if they are missing or inconsistent, contains default logic which sets the entries and processes the run. Thus, if the search on entries are both left blank, the program sets the entry to indicate that the match is to be made using the client's combined profile. If the preference booklet was the only one input, or if it is the only one that contains at least ten good groups, then the entry is reset to search on preference only. An error message is printed to indicate the problem with the input entries, but the run will be made according to the default logic.

Error messages are printed for each and every error detected, whether or not the input was processed. Errors are corrected by inputting the corrected or missing data using the SICL input form. Errors can be corrected with no new output being produced, i.e., entering the client's birthdate when this was the only item missing, but indicating that a new search is not required.

4.2.3.2 The SER Management Information System

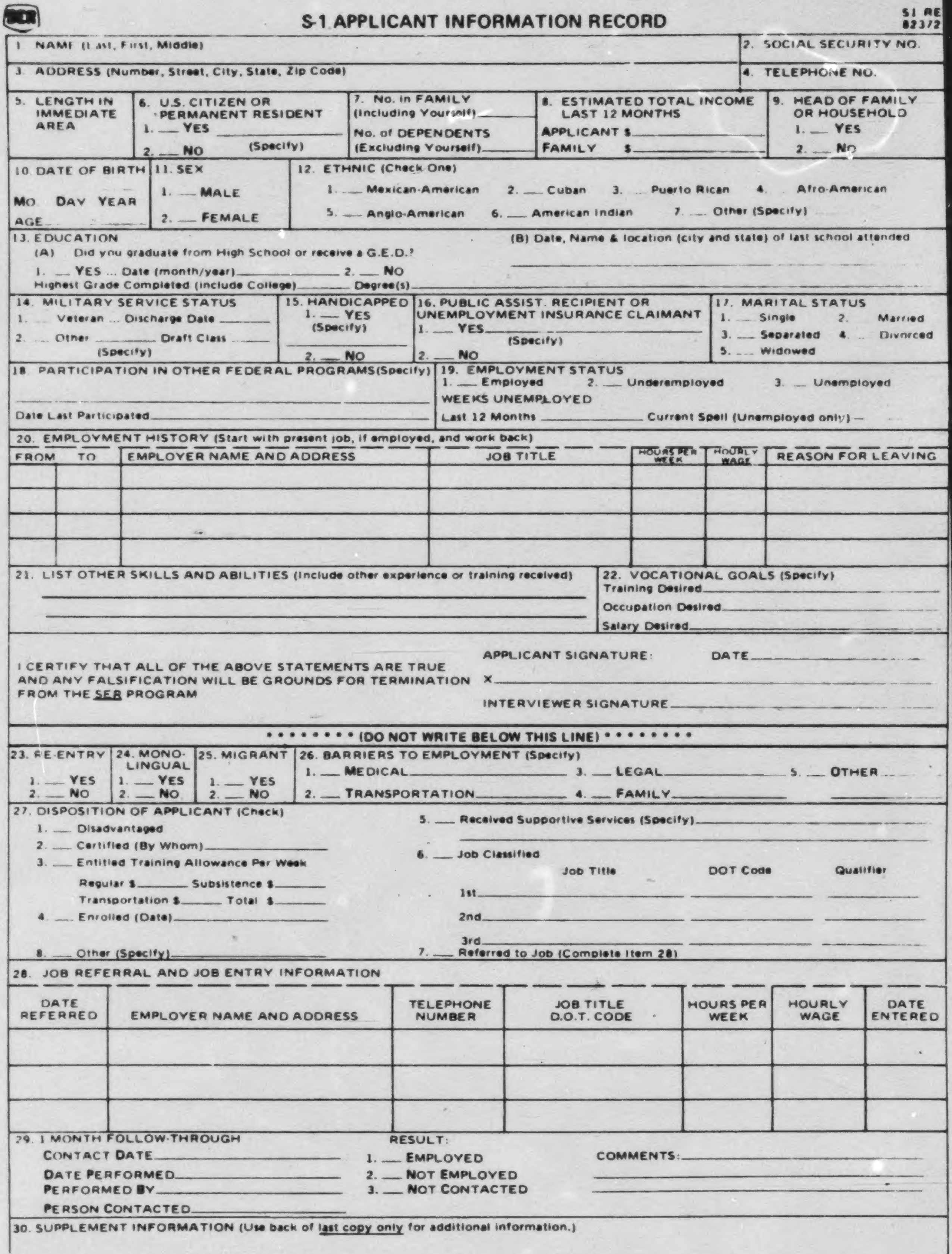
The SER Management Information System (MIS) consists of five forms and four monthly reports. As has been mentioned, the system is similar to the WIN, MDTA, and CETA reporting systems. The five reporting forms are as follows:

- S-1 Applicant Information Record (see Figure 4-5). This form is used to collect pertinent information on the personal, educational, and occupational characteristics of each individual who applies to SER for services. For those individuals who come to SER for direct job referral services, this is the only form used. The job referrals made on their behalf are recorded on this form as is the one-month retention followup required for all direct job placements. This form is partially completed by the applicant.

- S-2 Employability Development Plan (EDP) (see Figure 4-6). After an applicant is enrolled into the SER program for training, an Employability Development Plan (EDP) is determined and drawn up on the S-2. This includes the vocational goals, test results, qualifications needed for goal, the employment opportunities, the steps necessary to reach goal, and other circumstances affecting job entry possibilities that need attention. In the EDP, every status that the enrollee will be in is written down. For each status, the EDT member responsible, the starting date, the training days to be spent, and, if change is required, the reason for modification is also written down.

- S-3A Status Change Notice (see Figure 4-7). The S-3A provides a record of an enrollee's movement through the SER program and is the basis for tallying and checking program activities for monthly reporting purposes. The S-3A is filled out by the team each time an enrollee's status in the program changes. That is, it is filled out whenever an enrollee enters the program, moves from one component to another, moves into or out of a holding status or job entry status, or terminates from the program. A different S-3A is filled out every time the enrollee changes status. The S-3A is also used as a memo of the next probable status change. This S-3A is referred to as the next S-3A.

- S-4 Enrollee Record (see Figure 4-8) The S-4 provides a chronological history of the enrollee's activities in the SER program and a record of the time and cost that the enrollee spent in each component and status. The S-4 is used to record all of the enrollee's movements through the program. It is a summary record on one piece of paper of all the enrollee's program activities: job entry and follow-through information. The S-4 is updated from the S-3A forms that are filled out each time there is a change in the enrollee's status.



SI RE 82372

S-1 APPLICANT INFORMATION RECORD

1. NAME (Last, First, Middle)
2. SOCIAL SECURITY NO.
3. ADDRESS (Number, Street, City, State, Zip Code)
4. TELEPHONE NO.
5. LENGTH IN IMMEDIATE AREA
6. U.S. CITIZEN OR PERMANENT RESIDENT 1. ___ YES ___________ 2. ___ NO (Specify)
7. No. in FAMILY (Including Yourself) ______ No. of DEPENDENTS (Excluding Yourself) ______
8. ESTIMATED TOTAL INCOME LAST 12 MONTHS APPLICANT $__________ FAMILY $__________
9. HEAD OF FAMILY OR HOUSEHOLD 1. ___ YES 2. ___ NO
10. DATE OF BIRTH MO. DAY YEAR AGE ______
11. SEX 1. ___ MALE 2. ___ FEMALE
12. ETHNIC (Check One) 1. ___ Mexican-American 2. ___ Cuban 3. ___ Puerto Rican 4. ___ Afro-American 5. ___ Anglo-American 6. ___ American Indian 7. ___ Other (Specify)
13. EDUCATION (A) Did you graduate from High School or receive a G.E.D.? 1. ___ YES ... Date (month/year) ________ 2. ___ NO Highest Grade Completed (include College) ______ Degree(s) ______
(B) Date, Name & location (city and state) of last school attended
14. MILITARY SERVICE STATUS 1. ___ Veteran ... Discharge Date ______ 2. ___ Other ______ Draft Class ______ (Specify)
15. HANDICAPPED 1. ___ YES (Specify) ______ 2. ___ NO
16. PUBLIC ASSIST. RECIPIENT OR UNEMPLOYMENT INSURANCE CLAIMANT 1. ___ YES ______ (Specify) 2. ___ NO
17. MARITAL STATUS 1. ___ Single 2. ___ Married 3. ___ Separated 4. ___ Divorced 5. ___ Widowed
18. PARTICIPATION IN OTHER FEDERAL PROGRAMS (Specify) ______ Date Last Participated ______
19. EMPLOYMENT STATUS 1. ___ Employed 2. ___ Underemployed 3. ___ Unemployed WEEKS UNEMPLOYED Last 12 Months ______ Current Spell (Unemployed only) ______
20. EMPLOYMENT HISTORY (Start with present job, if employed, and work back)

FROM	TO	EMPLOYER NAME AND ADDRESS	JOB TITLE	HOURS PER WEEK	HOURLY WAGE	REASON FOR LEAVING

21. LIST OTHER SKILLS AND ABILITIES (Include other experience or training received)
22. VOCATIONAL GOALS (Specify) Training Desired ______ Occupation Desired ______ Salary Desired ______

I CERTIFY THAT ALL OF THE ABOVE STATEMENTS ARE TRUE AND ANY FALSIFICATION WILL BE GROUNDS FOR TERMINATION FROM THE SER PROGRAM

APPLICANT SIGNATURE: DATE ______
X ______
INTERVIEWER SIGNATURE ______

• • • • • • • • (DO NOT WRITE BELOW THIS LINE) • • • • • • • •

23. RE-ENTRY 1. ___ YES 2. ___ NO
24. MONO-LINGUAL 1. ___ YES 2. ___ NO
25. MIGRANT 1. ___ YES 2. ___ NO
26. BARRIERS TO EMPLOYMENT (Specify) 1. ___ MEDICAL ______ 2. ___ TRANSPORTATION ______ 3. ___ LEGAL ______ 4. ___ FAMILY ______ 5. ___ OTHER ______
27. DISPOSITION OF APPLICANT (Check)
1. ___ Disadvantaged
2. ___ Certified (By Whom) ______
3. ___ Entitled Training Allowance Per Week
Regular $______ Subsistence $______
Transportation $______ Total $______
4. ___ Enrolled (Date) ______
5. ___ Received Supportive Services (Specify) ______
6. ___ Job Classified

	Job Title	DOT Code	Qualifier
1st			
2nd			
3rd			

7. ___ Referred to Job (Complete Item 28)
8. ___ Other (Specify) ______

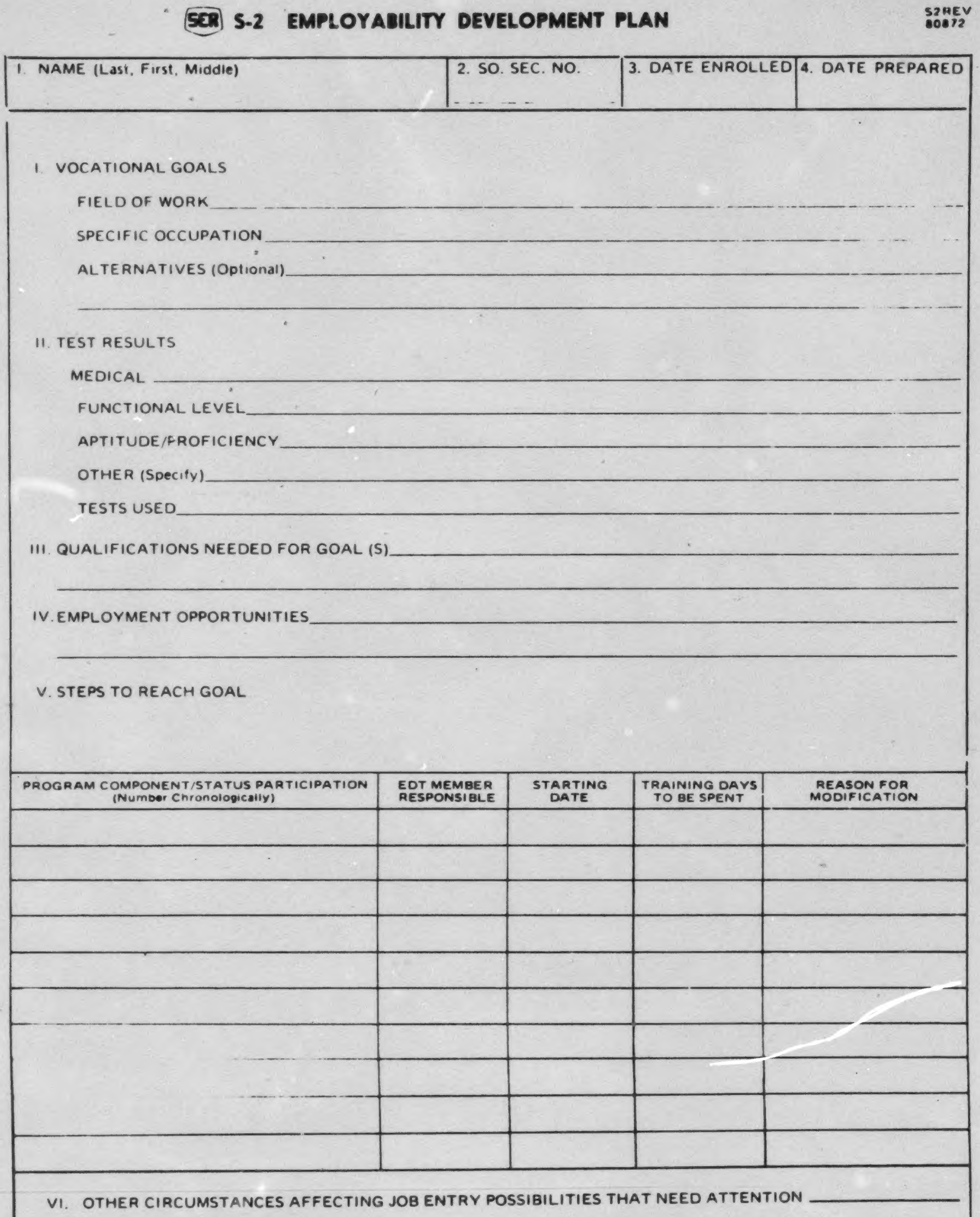
28. JOB REFERRAL AND JOB ENTRY INFORMATION

DATE REFERRED	EMPLOYER NAME AND ADDRESS	TELEPHONE NUMBER	JOB TITLE D.O.T. CODE	HOURS PER WEEK	HOURLY WAGE	DATE ENTERED

29. 1 MONTH FOLLOW-THROUGH
CONTACT DATE ______
DATE PERFORMED ______
PERFORMED BY ______
PERSON CONTACTED ______
RESULT: 1. ___ EMPLOYED 2. ___ NOT EMPLOYED 3. ___ NOT CONTACTED
COMMENTS: ______

30. SUPPLEMENT INFORMATION (Use back of last copy only for additional information.)

Figure 4-5. SER Applicant Information Record Form (S1 Form)



SER **S-2 EMPLOYABILITY DEVELOPMENT PLAN**

S2REV 80872

1. NAME (Last, First, Middle)	2. SO. SEC. NO.	3. DATE ENROLLED	4. DATE PREPARED

I. VOCATIONAL GOALS

FIELD OF WORK ______

SPECIFIC OCCUPATION ______

ALTERNATIVES (Optional) ______

II. TEST RESULTS

MEDICAL ______

FUNCTIONAL LEVEL ______

APTITUDE/PROFICIENCY ______

OTHER (Specify) ______

TESTS USED ______

III. QUALIFICATIONS NEEDED FOR GOAL (S) ______

IV. EMPLOYMENT OPPORTUNITIES ______

V. STEPS TO REACH GOAL

PROGRAM COMPONENT/STATUS PARTICIPATION (Number Chronologically)	EDT MEMBER RESPONSIBLE	STARTING DATE	TRAINING DAYS TO BE SPENT	REASON FOR MODIFICATION

VI. OTHER CIRCUMSTANCES AFFECTING JOB ENTRY POSSIBILITIES THAT NEED ATTENTION ______

Figure 4-6. SER Employability Development Plan: S2 Form

4.1-2

SER S-3A STATUS CHANGE NOTICE

1. NAME: (Last, First, Middle)	2. SOC. SEC. NO.	3. DATE OF CHANGE

☐ NEW ENROLLEE

☐ RE-ENTRY

4. LEAVING	COMPONENT/STATUS	5. ENTERING
☐	A. JPC	A. ☐
☐	B. ESL	B. ☐
☐	C. ABE	C. ☐
☐	D. AĀE (GED) (Specify) ______	D. ☐
☐	E. VOCATIONAL TRAINING (Complete Item 8) ______	E. ☐
☐	F. OJT (Complete Item 8) ______	F. ☐
☐	G. PLANNED SUSPENSE (Complete Item 8) ______	G. ☐
☐	H. JOB ENTRY HOLDING	H. ☐
☐	I. PROGRAM HOLDING (Specify) ______	I. ☐

TERMINATION

130 INDIRECT JOB ENTRY (Complete Items 6 & 7) ☐
Annual Wage at Enrollment $______

140 NEUTRAL TERMINATION (Specify) ☐
______

150 DROPOUT (Specify) ☐
______

6. E D P COMPLETED (Indirect Job Entry Only)

☐ YES ☐ NO

7. JOB ENTRY INFORMATION

Employer ______
Telephone No. ______
Address ______
City, State, ______ Zip ______
Hrs./Wk. ______ Hourly Wage ______
Job Title ______
D O T Code (6 Digit) ______

8. TRAINING INFORMATION (Outside SER Project)

Trainer ______
Telephone No. ______
Address ______
City, State, ______ Zip ______
Hrs./Wk. ______ Trng. Allowance/Wk. ______
Training ______
D O T Code (6 Digit) ______
OJT Contract: From ______ To ______

9. STATUS CHANGE VERIFIED BY:

x ______

10. NEXT PROBABLE STATUS CHANGE

______

______

11. TOTAL PARTICIPATION DURING LAST STATUS

Days Present ____ Days Absent (Excused) ____ Days Absent (Unexcused) ____

12. TOTAL TRAINING ALLOWANCE DURING LAST STATUS

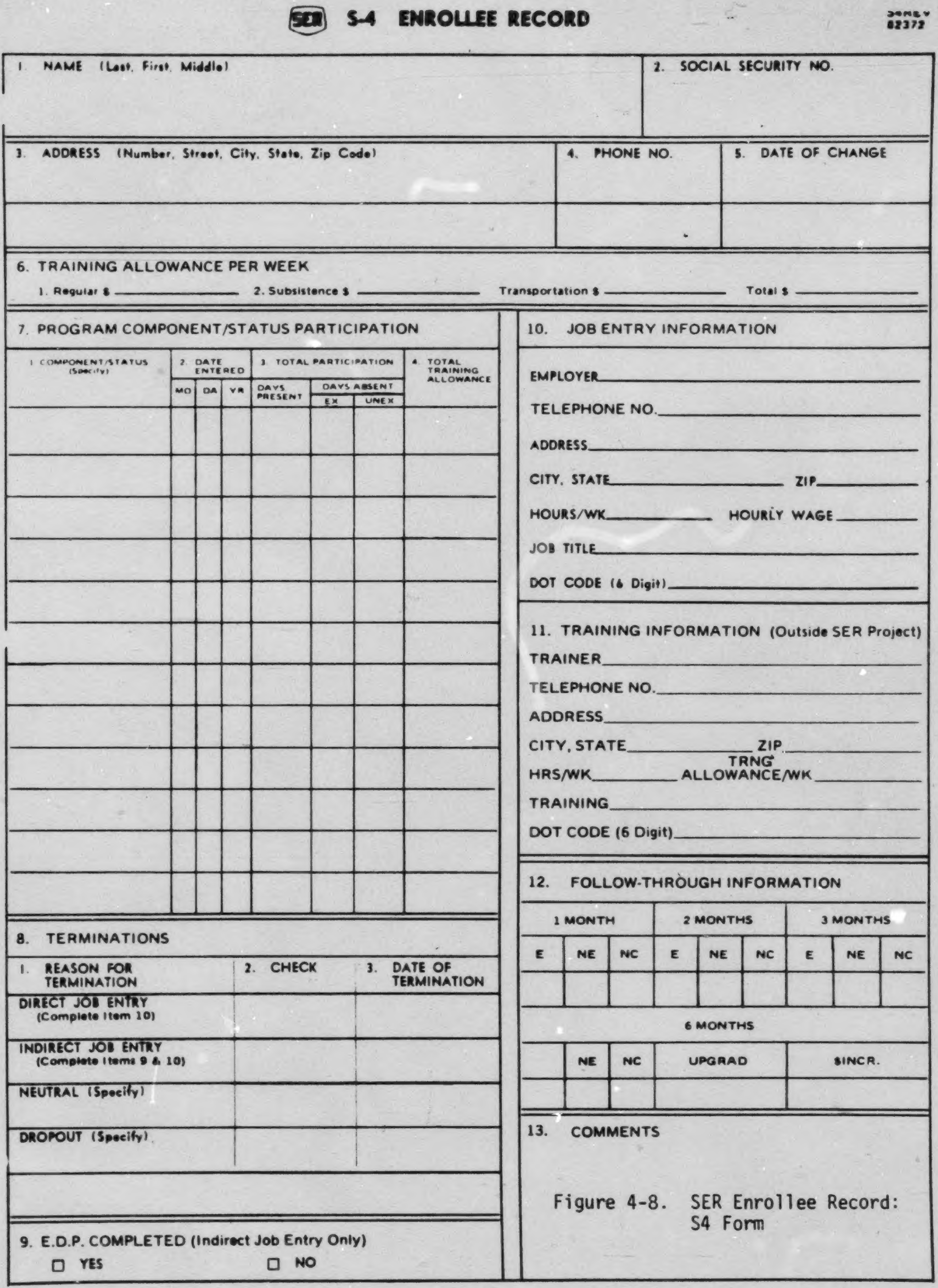
Total Training Allowance $ ______

13. COMMENTS: ______

______

______

Figure 4-7. SER Status Change Form: S3A Form



SER S-4 ENROLLEE RECORD

S4REV
02372

1. NAME (Last, First, Middle)	2. SOCIAL SECURITY NO.

3. ADDRESS (Number, Street, City, State, Zip Code)	4. PHONE NO.	5. DATE OF CHANGE

6. TRAINING ALLOWANCE PER WEEK

1. Regular $ ______ 2. Subsistence $ ______ Transportation $ ______ Total $ ______

7. PROGRAM COMPONENT/STATUS PARTICIPATION

1 COMPONENT/STATUS (Specify)	2. DATE ENTERED			3. TOTAL PARTICIPATION			4. TOTAL TRAINING ALLOWANCE
					DAYS ABSENT		
	MO	DA	YR	DAYS PRESENT	EX	UNEX	

8. TERMINATIONS

1. REASON FOR TERMINATION	2. CHECK	3. DATE OF TERMINATION
DIRECT JOB ENTRY (Complete Item 10)		
INDIRECT JOB ENTRY (Complete Items 9 & 10)		
NEUTRAL (Specify)		
DROPOUT (Specify)		

9. E.D.P. COMPLETED (Indirect Job Entry Only)

☐ YES ☐ NO

10. JOB ENTRY INFORMATION

EMPLOYER ______

TELEPHONE NO. ______

ADDRESS ______

CITY, STATE ______ ZIP ______

HOURS/WK ______ HOURLY WAGE ______

JOB TITLE ______

DOT CODE (6 Digit) ______

11. TRAINING INFORMATION (Outside SER Project)

TRAINER ______

TELEPHONE NO. ______

ADDRESS ______

CITY, STATE ______ ZIP ______

HRS/WK ______ TRNG ALLOWANCE/WK ______

TRAINING ______

DOT CODE (6 Digit) ______

12. FOLLOW-THROUGH INFORMATION

1 MONTH			2 MONTHS			3 MONTHS		
E	NE	NC	E	NE	NC	E	NE	NC

6 MONTHS				
	NE	NC	UPGRAD	$INCR.

13. COMMENTS

Figure 4-8. SER Enrollee Record: S4 Form

- S-5 Follow-through Record (see Figure 4-9)

  This form is used to record the six-month retention followup that is required for all SER enrollees placed into jobs. This form is initiated when the enrollee is placed into a job or is placed via an OJT contract.

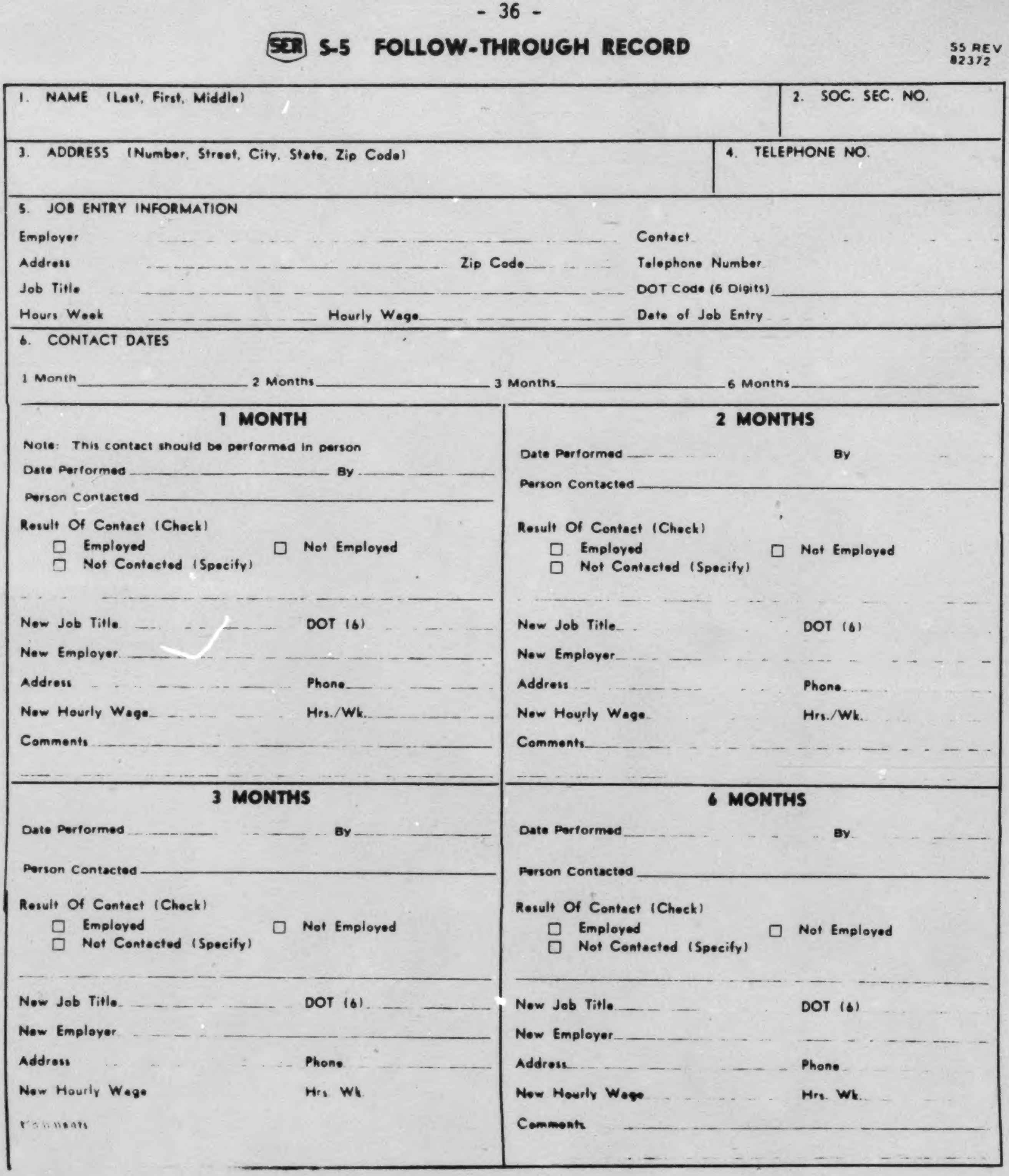
Copies of the S-1, S-4, and S-5 were to be obtained from the SER office for each client who took the SICL. The retention followup data used in the analysis was obtained by Ultrasystems directly and was not obtained from the S-5 form. The S-5 forms filled out by SER for all the enrollees who took SICLs were not obtained and so no comparison of their followup data with that obtained by Ultrasystems is available. It should be noted that the retention of the direct job placements is only determined by SER for one month. Copies of these forms were obtained only while the SICL administrators were working at the SER offices. After the four-month period of SICL administration ended, the subsequent job placement data was obtained via periodic visits to each of the SER offices. During these visits, Ultrasystems went through the SER client case files for those clients who took SICLs. Once Ultrasystems attained the required number of job placements for the job profiling and retention followup activities, the process of searching the SER case files was discontinued. Thus Ultrasystems did not obtain data on the services provided all the clients who took SICLs.

4.2.3.3 Special Keypunch Cards Generated by the CJMS Computer Program Utilized in the SER Experiment

In order to facilitate the eventual analyses, a special set of computer-readable output cards was generated for each client who took the SICL booklets. These output cards contained data that identified each client and contained the client's preference, experience, and combined dimension scores. These cards could then be input to the program to generate matches against the job profiles that were later obtained without going through the processing associated with the conversion of the input SICL phrase numbers into dimension scores.

4.2.4 Administration of the Job Outline Checklists (JOCLs)

The Cleff system job profiles, for those jobs into which SER clients who took SICLs were placed, were obtained by Ultrasystems. These profiles were obtained after the client was hired and, in some cases, after the client had already terminated. All the profiles were obtained in the summer and fall of 1973. The data obtained from the SER client case files, for those people who took SICLs, provided



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SER S-5 FOLLOW-THROUGH RECORD

S5 REV
82372

1. NAME (Last, First, Middle)
2. SOC. SEC. NO.
3. ADDRESS (Number, Street, City, State, Zip Code)
4. TELEPHONE NO.

5. JOB ENTRY INFORMATION

Employer ______ Contact ______
Address ______ Zip Code ______ Telephone Number ______
Job Title ______ DOT Code (6 Digits) ______
Hours Week ______ Hourly Wage ______ Date of Job Entry ______

6. CONTACT DATES

1 Month ______ 2 Months ______ 3 Months ______ 6 Months ______

1 MONTH

Note: This contact should be performed in person
Date Performed ______ By ______
Person Contacted ______
Result Of Contact (Check)
☐ Employed ☐ Not Employed
☐ Not Contacted (Specify)
______
New Job Title ______ DOT (6) ______
New Employer ______
Address ______ Phone ______
New Hourly Wage ______ Hrs./Wk. ______
Comments ______

2 MONTHS

Date Performed ______ By ______
Person Contacted ______
Result Of Contact (Check)
☐ Employed ☐ Not Employed
☐ Not Contacted (Specify)
______
New Job Title ______ DOT (6) ______
New Employer ______
Address ______ Phone ______
New Hourly Wage ______ Hrs./Wk. ______
Comments ______

3 MONTHS

Date Performed ______ By ______
Person Contacted ______
Result Of Contact (Check)
☐ Employed ☐ Not Employed
☐ Not Contacted (Specify)
______
New Job Title ______ DOT (6) ______
New Employer ______
Address ______ Phone ______
New Hourly Wage ______ Hrs. Wk. ______
Comments ______

6 MONTHS

Date Performed ______ By ______
Person Contacted ______
Result Of Contact (Check)
☐ Employed ☐ Not Employed
☐ Not Contacted (Specify)
______
New Job Title ______ DOT (6) ______
New Employer ______
Address ______ Phone ______
New Hourly Wage ______ Hrs. Wk. ______
Comments ______

Figure 4-9. SER Follow-Through Record:
Form S5

Ultrasystems with the information needed to identify the jobs and the employers with whom the experimental group clients had been placed. Ultrasystems contacted these employers directly, by phone, and asked them if they would allow us to administer the JOCL with the immediate job supervisor of the person who had been hired. The purpose of the request was explained and a pledge of confidentiality was given. In some cases, the employer requested a letter from Ultrasystems again explaining the purpose of the request and pledging, in writing, confidentiality of the information obtained. Exhibit 4-1 shows such a letter and the pledge of confidentiality. Approximately 25 percent of the employers contacted refused to allow us to administer the JOCL. In addition, six employers who agreed to let us administer JOCLs failed to finish the checklist. The final data base consists of 110 individual JOCLs administered at 100 separate employers, covering 142 clients.

The administration of the JOCL consisted of the following steps:

i) Verification that the client recorded by SER as having been placed at the company was indeed working there or had worked there. This included verifying the hire date and the job. No cases were encountered where the person recorded by SER had not been hired by the company. (Note: Several of the employers who refused to allow us to administer the job outline stated that the person whom we named never worked there. It is Ultrasystems' opinion that this was their way of saying that they did not want to be bothered.)

ii) The on-the-job supervisor who was to complete the JOCL was asked to briefly describe the job that was being profiled. In many cases, the Ultrasystems staff person administering the JOCL asked to be, and was, shown people doing the job. In some cases, this was not necessary because the job was one that was familiar to the Ultrasystems staff person, e.g., a bank teller, a parking lot attendant.

iii) The mechanics of completing the JOCL were explained using the terminology included in the JOCL booklet.

iv) The finished booklets were checked for completeness and in some cases the resultant profile was drawn and discussed with the respondent.

EXHIBIT 4-1

12 July 1973

Mr. [redacted]
[redacted]
Los Angeles, California 90005

Dear Mr. [redacted]

On Tuesday and Wednesday, July 10th and 11th, Ms. from Ultrasystems, Inc. spoke with you concerning the possibility of arranging an interview with your company with regard to a government-sponsored research effort that Ultrasystems is conducting. Ms. informed me that you were interested in agreeing to the interview, but that you would like some more information regarding the nature of the interview and the research effort Ultrasystems is engaged in. This letter will briefly explain what the requested interview is all about.

The research effort is being performed by Ultrasystems, Inc. under contract to the U.S. Office of Economic Opportunity. The research concerns evaluating the effectiveness of an experimental computerized man-job matching system. The purpose of this project is to try to develop aids for use in screening applicants to find the workers who best meet an employer's job requirements. As part of this research, Ultrasystems, Inc. has been working with the Los Angeles SER office. For the last few months the Los Angeles SER office has been administering a set of multiple-choice questionnaires to the people who come to their office for job placement and training assistance. Their records indicate that, to date, two of the people who completed these questionnaires were hired by the [redacted] The requested visit to your company is for the purpose of interviewing someone in your organization concerning the nature of the jobs that these individuals were hired into. (The individuals and their respective jobs are: [redacted] who was hired as a Maintenance Man, and [redacted], who was hired as a Jr. Clerk (Small Office), as indicated by our records). The interview involves the completion of a structured multiple-choice questionnaire that defines the particular job. I have attached a copy of one page of the ten page questionnaire. As you can see, the questionnaire is fairly simple and straightforward. It is important that the person completing the questionnaire is very familiar with the particular job in question.

LTRASYSTEMS, INC.
00 NEWPORT CENTER DRIVE • NEWPORT BEACH, CALIFORNIA 92660 • 714-644-4100

EXHIBIT 4-1 (continued)

Mr. [redacted]

12 July 1973
Page 2

The information obtained from your organization through this questionnaire will be treated with complete confidentiality. Your name, the company name, the employee's name, and the name(s) of the people involved in completing the questionnaire will never be revealed. I have enclosed a letter confirming our pledge of confidentiality.

I hope that this brief description will help clarify what the purpose and extent of the interview is. I also hope that you will permit us to complete the interview, at your convenience. Ms. will contact you again in the near future regarding this request.

Sincerely yours,

ULTRASYSTEMS, INC.

EXHIBIT 4-1 (continued)

12 July 1973

Mr. [redacted]
[redacted]
Los Angeles, California 90005

Dear Mr. [redacted]

Ultrasystems hereby certifies that all the information provided to Ultrasystems regarding job descriptions obtained in conjunction with Ultrasystems' government-sponsored research effort will be treated in a confidential manner. Ultrasystems specifically certifies that the name of your organization, the names of all personnel interviewed, and all applicants and employees for which data has been obtained, will not be used in any reports produced by Ultrasystems. Thus, the data provided by your organization will be used in a confidential manner to assess the effectiveness of the Job Matching System being investigated.

Thank you for your assistance to our staff in its activities related to the Job Matching System evaluation undertaken under Contract No. B2C-5415 for the United States Office of Economic Opportunity.

Very truly yours,

ULTRASYSTEMS, INC.

ULTRASYSTEMS, INC.
500 NEWPORT CENTER DRIVE • NEWPORT BEACH, CALIFORNIA 92660 • 714-644-4100

v) The respondent was told about the purpose of the study and their cooperation in the retention followup phase was solicited. Only one employer was later to refuse to provide retention followup data.

Most aspects of JOCL administration are straightforward. However, one does encounter situations where the respondent cannot choose enough phrases on each page. This is often due to the respondent failing to find phrases that directly relate to the job being profiled. Ultrasystems followed the approach taught to us by Mr. Ron Harris. This consisted of repetition of the instructions emphasizing the instructional phrases most resemble, most like, etc. If this failed, then we used examples based on the phrases in the booklet but related to a different job. In other words, we would briefly describe another job and then show how the phrases listed were like or resembled behaviors required for this other job. In a few cases, this was not enough and these resulted in the respondent refusing to complete the booklet.

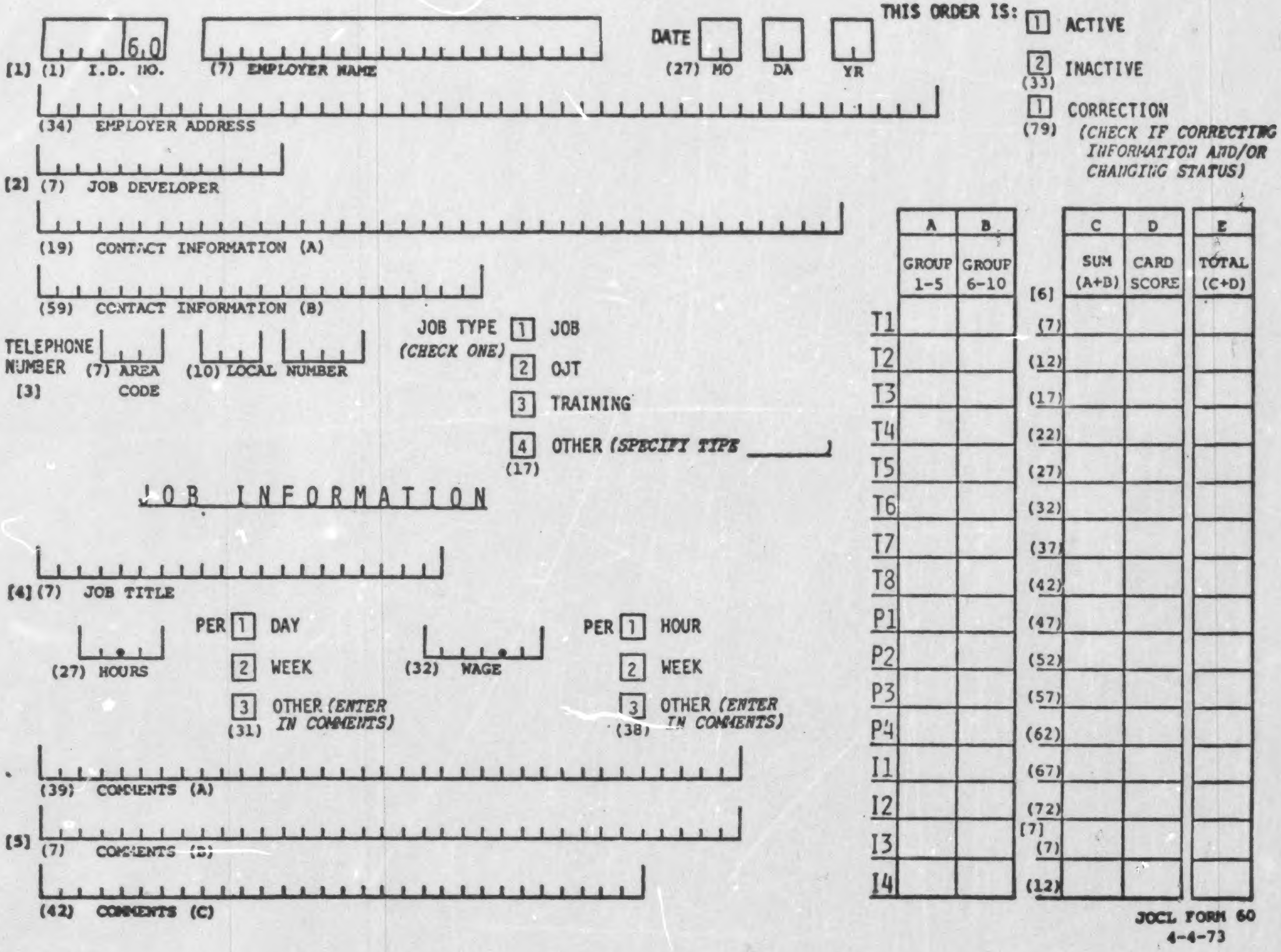
There is one other aspect of JOCL administration that needs to be mentioned. This has to do with the card sort portion of the JOCL. The "official" instructions regarding this aspect of JOCL administration were briefly given in Section 2 of Vol. I and are shown in Appendix E. Ultrasystems, with the agreement of ADP-PDS Inc., did not administer this portion of the JOCL exactly according to these instructions. The difference was not in the manner in which the cards were chosen or discarded. The difference was in the manner in which the cards were scored. Ultrasystems had the respondent rank-order the two sets of five cards. Thus, for the five cards chosen which best describe what must be done on the job in order to do it right, the respondent rank-ordered these cards instead of independently assigning the scale values defined as outstanding, very great, great, a lot, and some. Thus, only one card would be listed as outstanding, i.e., the highest ranked card. The "official" rules of JOCL administration require that the final sum of the positive and negative scores across the sixteen dimensions add to zero. Independently assigning scale values to each card means that the sum obtained may not add to zero. One then has to "normalize" the individual dimension scores. No "official" instructions were ever provided Ultrasystems dealing with how one goes about normalizing the dimension scores. The only instructions given us were that one adjusts the highest positive and the lowest negative scores inward (toward zero) so that the sum balances. This reduces the peaks of the resultant profile. Instead of doing this, Ultrasystems elected to rank-order the cards and was told by ADP-PDS that this approach would be acceptable.

The answers obtained via the JOCL were input into the computer program using the input form shown in Figure 4-10. Actually, two computer programs were utilized in the SER/Cleff experiment. The first one processed the SICL input, generated the client profiles, and calculated the match scores using either the cluster profiles or actual job profiles. This program was discussed earlier. The second program processed the JOCL input, generated the job profile, and maintained the job profile data base. The SICL processing program accessed the job profile data base for the job-client matches. The JOCL input form shown in Figure 4-10 contains information about the employer and the job in addition to the JOCL booklet and card scores. The job description data is not as detailed as the data contained on the standard Employment Service Job Bank Job Order form. Suffice it to say that the inclusion of more data items on the JOCL input form is straightforward and simple.

The JOCL computer program also contains error checking similar to that described for the SICL processing program. In particular, the program checks the dimension score sum to check that it adds to zero. One should note that the JOCL structure is different than the SICL in that the ordering of the phrases relating to each dimension on each page of the JOCL is not scrambled from page to page. This enables one to easily obtain the dimension scores directly by adding across the pages (or groups). Thus, the dimension scores are input directly, which is different than what has to be done with the SICL; i.e., the phrases selected on each page are input via their phrase number and the computer program unscrambles these inputs and calculates the dimension scores.

The JOCL processing program enables the user to change the status of the job order from active to inactive or vice versa. The program establishes separate JOCL files for active and inactive orders, which enables the user to select the orders to be matched when inputting SICLs.

Figure 4-11 shows the job order profile produced by this program from the JOCL input. Figure 4-4 shown earlier showed the output produced by matching a client's SICL with the job order file. The figure shows that the job orders are sequenced by the job match index resulting from the correlation of the client and job profiles. The top "n" job matches are printed with the full job description. The remaining job profiles are only identified by their assigned job order number along with the values of the job match and job difference indices obtained. This was done to conserve space and the number "N" is controlled by the user. The description of the job can be obtained by finding the appropriate job order profile (as shown in Figure 4-10) in the job order file.



[1] (1) I.D. NO. 6 0 (7) EMPLOYER NAME

DATE (27) MO DA YR

THIS ORDER IS: ☐1 ACTIVE

☐2 INACTIVE
(33)

☐1 CORRECTION
(79) *(CHECK IF CORRECTING INFORMATION AND/OR CHANGING STATUS)*

(34) EMPLOYER ADDRESS

[2] (7) JOB DEVELOPER

(19) CONTACT INFORMATION (A)

(59) CONTACT INFORMATION (B)

TELEPHONE NUMBER [3] (7) AREA CODE (10) LOCAL NUMBER

JOB TYPE *(CHECK ONE)*
☐1 JOB
☐2 OJT
☐3 TRAINING
☐4 OTHER *(SPECIFY TYPE* ______)
(17)

JOB INFORMATION

[4] (7) JOB TITLE

(27) HOURS

PER ☐1 DAY
☐2 WEEK
☐3 OTHER *(ENTER IN COMMENTS)*
(31)

(32) WAGE

PER ☐1 HOUR
☐2 WEEK
☐3 OTHER *(ENTER IN COMMENTS)*
(38)

(39) COMMENTS (A)

[5] (7) COMMENTS (B)

(42) COMMENTS (C)

	A	B		C	D	E
	GROUP 1-5	GROUP 6-10	[6]	SUM (A+B)	CARD SCORE	TOTAL (C+D)
T1			(7)			
T2			(12)			
T3			(17)			
T4			(22)			
T5			(27)			
T6			(32)			
T7			(37)			
T8			(42)			
P1			(47)			
P2			(52)			
P3			(57)			
P4			(62)			
I1			(67)			
I2			(72)			
I3			[7] (7)			
I4			(12)			

JOCL FORM 60
4-4-73

Figure 4-10. JOCL Input Form

```
______________ A V O I D A N C E__________   ___A P P R O A C H ______________
                                        INSIG
                   STRONG     HIGH   LOW     LOW  HIGH      STRONG
_____           25 _______ 15________5 3  0  3 5_______  15_______ 25_________
    THING ORIENTED
T1 ATHLETIC                           JJJJ0
                                          0
T2 UTILITY                                0JJJJJJ
                                          0
T3 MANUAL-FINE                            0J
                                          0
T4 -GROSS INDEP                       JJJJ0
                                          0
T5 -GROSS DEPEN                         JJ0
                                          0
T6 ORDER                                  0JJJJJJJ
                                          0
T7 CORRECTION                             0JJJ
                                          0
T8 LOCOMOTION              JJJJJJJJJJJJJJJ0
                                          0
    PEOPLE ORIENTED
P1 ATTENDANCE                             0JJJJJJJJJJJJJ
                                          0
P2 PHYS SERVICE     JJJJJJJJJJJJJJJJJJJJJJ0
                                          0
P3 MANAGEMENT                             0JJJ
                                          0
P4 PERSUASIVE                             0JJ
                                          0
    IDEA ORIENTED
I1 VERBAL                                 0JJJJJJ
                                          0
I2 NUMERICAL                              0JJJJJJJJJJJJJJJJJ
                                          0
I3 CLERICAL                        JJJJJJJ0
                                          0
I4 INNOVATIVE                         JJJJ0
                                          0

1002 CASHIER                07/12/73
40.00 HRS/WEEK   $   2.67/HOUR   CHECK OUT GROCERIES GREET PEOPLE
WAIT ON CUSTOMERS CASH CHECKS COUNTMONEY AT THE END OF THE DAY
[redacted]            [redacted] PICO BLVD. LOS ANGELES, CA. 90015
CONTACT [redacted]
INACTIVE  DEVELOPED BY PORTILLO      [redacted]

  T1  T2  T3  T4  T5  T6  T7  T8  P1  P2  P3  P4  I1  I2  I3  I4
  -4   6   1  -4  -2   7   3 -15  13 -22   3   2   6  17  -7  -4
```

← Phone Number

Name Of Job Developer

← Name Of Person To Contact

Company Name And Address

Figure 4-11. Sample JOCL Output

Before moving on to the next topic, there is one other subject to be discussed. This has to do with the issue of non-response bias due to the failure to obtain job profiles from all employers contacted and, in a sense, due to the selection of both the clients who took SICLs and those included in the followup data base. As has been discussed, every applicant and enrollee at each SER office did not take an SICL and, of those that did and were placed, only 142 were included in the data base.

Thus, we have a situation where the selection of clients to take the SICLs was not complete and was not random. In fact, the process was one of self-selection where the self refers to the client or to the instructor. The inclusion of clients in the data base was based on their hire date; inclusion was done sequentially as opposed to, say, randomly selecting clients from all those hired over some time period. Failure to obtain a JOCL meant that this client was replaced by another client farther down in the hiring date queue. Failure to subsequently obtain retention data meant that the client was dropped without replacement.

Because the analysis of the retention and Cleff score data was not done with the objectives of: 1) comparing this data to another set of clients who did not take the SICL (a comparison group), and 2) obtaining representative retention data about SER placements, Ultrasystems believes that the manner in which the data base was assembled does not bias the results. As will be shown in Section 5 to follow, the client characteristics (of those clients included in the data base) were broadly representative of SER clients in general. Whereas no comparative job characteristic data was obtained, the spectrum of jobs that were profiled was quite broad and was essentially completely in the areas generally characterized as low to semi-skilled. The key point is that the analysis was based on the relationship between the Cleff scores and the client's eventual retention. Since no cut-off score criteria were imposed, the resultant score distribution was quite broad.

In regard to this issue, it should be noted that no distinction has been made between direct and indirect job placements. Again, the analysis was not done with the purpose of analyzing the comparative retention of people trained by SER and people who were only provided job referral services by SER.

There is no question, however, that the clients whose data were utilized are not broadly representative of the population of low or semi-skilled job seekers. The vast majority of the clients were Spanish-speaking Americans. The initial development of the CJMS was done using a totally different type of person, i.e., not a Spanish-speaking American (see Appendices A and B). What effect the type of client (defined by more than just the identification as a Spanish-speaking American) has on the resultant SICL profiles and therefore on the resultant job-client match scores is not known. No statistical analysis of client characteristics and SICL profiles was done under this study.

4.2.5 Retention Tracking

The tracking of client retention was done at four time points, i.e., December 31, 1973, February 28, 1974, May 31, 1974, and December 10, 1974. In addition, some termination data was obtained at the time the JOCL was administered; i.e., some clients had already terminated. Except for these cases, all the retention followup was done via telephone conversation with the employer. The employment status of the individual involved was determined and, if terminated, the date of the termination (last day worked) and the reason for termination were obtained. Once an employer indicated that the person had terminated, no more followup regarding this individual was done.

Ultrasystems did not contact any clients regarding their employment history. In addition, employers were not asked about job changes relating to the individuals in our sample; i.e., the retention was based on their employment with the employer. This is a serious issue in that the match scores are based on the profile of one job, i.e., the original job.

As was mentioned earlier in this report, there were cases where a given employer changed their employment status answer from one followup call to the next. This happened when the employer indicated that the person was still working and then at the next followup time point indicated that the person had been terminated and the date given was prior to the earlier call. When questioned about this, the employers indicated that this was due to the manner in which their payroll records were processed and that at the time of the followup call the only records available indicated that the person was still employed. When these records were updated, the new answer was available and this was obtained at the next retention followup time. This occurred in two cases between the December 31, 1973 and February 28, 1974 time points.

4.3 SOME OBSERVATIONS OF ULTRASYSTEMS' STAFF REGARDING THE SER/CLEFF EXPERIMENT

Exhibits 4-2 and 4-3 present verbatim written observations of two of the staff people involved in this study. The first (Exhibit 4-2) was prepared by Mr. Ron Harris at the conclusion of his activities in the SER offices. Mr. Harris, as has been mentioned previously, had been a counselor at the Business and Industrial Coordinating Council in Newark, New Jersey for approximately two years. He had been extensively involved with the CJMS both prior to and during the New Jersey experiment. Mr. Harris provided continuous on-site guidance and instruction during the course of the SER/Cleff experiment. The second set of observations was prepared by Mrs. Melinda Green, who was one of the people hired to administer SICLs at one of the SER offices. Ultrasystems has elected to remove references identifying particular SER agencies and their staffs from these observations. The full text of these observations is presented with the references blocked out.

Ultrasystems believes these observations are easily understood and address issues discussed in this report. Therefore, no further comment will be given.

EXHIBIT 4-2

INTEROFFICE CORRESPONDENCE

TO:

CC.

DATE: 12 July 1973

SUBJECT: Remarks on CJMS

FROM:

Undertaking Option "B" of the O.E.O. Cleff Job Matching System evaluation as proposed by Ultrasystems has broadened the undersigned's perspectives in terms of the systems acceptance, its capacity and its feasibility as a mechanism to arrest underemployment and unemployment. Essentially, it is these new perspectives that will be discussed in this communication.

Working with the SER organization at various local offices has brought about differing responses to the system. I'd like to spend time outlining the involvement and reaction of each office individually, and perhaps concluding with reference to the overall effect of the Cleff System as related to the SER organization.

[redacted]

Implementation of the system was primarily in conjunction with the scheduled procedure as outlined in interoffice memorandum from dated 3 April 1973, Subject: Objectives of CJMS Mini-Experiment. By the week of April 2, 1973, CJMS technician was fairly comfortable in assuming SICL administration procedures. During week of April 16, I was well into instructing the counselors on interpretation of computer printouts and analysis of SICL/client relationships. At this level, reaction and response were positive. Sr. counselor at this office opened discussion for utilization of the Cleff System as part of their normal intake procedures. There was some apprehension on the part of one subordinate counselor at this point. This, however, is attributed to this counselor's absence from two consecutive training sessions and the consequent lack of knowledge as to the system's functional design. Scheduling at this point prompted JOCL introduction. The subordinate counselor's problems were resolved through supplemental instruction from the Sr. Counselor.

Soliciting participation and cooperation of job developers and class instructors as related to their proposed involvement with JOCL procedure proved somewhat rougher than anticipated. Then-current work loads bore heavily on their schedules. Availability for training was minimal, necessitating a meeting with the Executive Director with [redacted] (Continued)

efforts directed at achieving participation of job developers as proposed in JOCL scheme. Participation was achieved, but attitudes were not particularly conducive to effective response to JOCL instruction. I think our problem here was that any involvement on their part was in addition to their already heavy schedule.

The decision to continue on our own was good. I feel we would have had more difficulty achieving the needed data for the evaluation had we continued their involvement. The response of business and industry in this area was generally good. Explanation of the system's design and intent brought many favorable, positive reactions. All will be looking for follow-up information from Ultrasystems/SER. Some inquired as to how they would or could benefit from the system if the evaluation shows positive proof. I think that for the most part, their involvement in a computerized matching system is new, and they are interested. You should get a high enough percentage of JOCL's to validate the match analysis.

[redacted]

This office, much smaller in size, and consequently volume, moved smoothly through SICL introduction, administration, instruction, counselor interpretation, and client analysis. The CJMS technician assigned to this office, conscientious in her procedure and the scope of her responsibility, performed SICL administration and clerically related assignments efficiently. Initial apprehension was prevalent during counselor introduction to SICL interpretation. Subsequent training, in addition to sample case match analysis demonstration, alleviated crucial skepticism. JOCL introduction again brought about schedule conflicts. Job developers were too burdened with routine responsibilities to participate effectively in JOCL administration and interpretation. Vacation schedules, monthly quota requirements, seminars, etc. were among reasons for job developer non-availability. As decreed by the Executive Director of this office, SER staff members would be unable to participate in JOCL collection due to the extent of their ongoing workload. Ultrasystems personnel were thus provided open avenues to persue and obtain JOCL's. The SER staff has been instructed to assist Ultrasystems personnel by providing information relative to those firms by whom SER clientele have been hired, to include names and positions of contact personnel, and suggested approach. Limited assistance in establishing initial contact will be available through job developers if deemed necessary by Ultrasystems.

EXHIBIT 4-2 (continued)

12 July 1973
Page 3

[redacted]

Some initial problems experienced here. CJMS technician experienced difficulty in implementing SICL procedures effectively. This difficulty was subsequently attributed to a lack of a people-oriented background. Much more additional instruction, guidance, and supervision was required at this office to bring technician to a comfortable level, consuming time and requiring scheduling revisions. Technician's attitude and educability were beyond reproach. Lack of exposure to manpower evaluation procedures and management, and/or supervisory techniques on the part of the technician prohibited schedule maintenance and required delays in the introduction of the system to counselors. This office additionally experienced inopportune job title changes, resulting in one counselor with an overbearing case load, and one "trainee" then currently being indoctrinated in counseling techniques and in in-house procedures at this office. While there were signs of latent interest and concern for the system and its potential, very little time was available to the counselor(s) to effectively engender the system's capabilities and capacity as a job matching mechanism and/or a counselor tool. Meetings with supervisory personnel of this office detailed intake processing procedures that conflicted with SICL administration to walk-in personnel by our technician. This conflict eventually precluded further administration of SICL's to walk-ins at this office, limiting our SICL intake to an independent request basis only, reducing the volume considerably. No true resolution came to fruition, severing SICL accumulation. Job developers spoke negatively about JOCL acquisition. In all, the system didn't seem to have positively influenced this office. Negativism prevailed throughout counselors, job developers, and management. I believe that the metropolitan environment of this office elicits a more realistic approach to social change on the part of this staff. A computerized job matching system perhaps seemed too unrealistic, and time required to process an applicant (SICL administration through placement) proved too consuming and involved to undertake without considerably more evidence that their efforts would achieve worthwhile results.

[redacted]

Organization and sound, basic management seem to permeate this office. Well-established intake, process and follow-up procedures enabled this office to undertake requirements for the Cleff evaluation with only moderate deviation from routine responsibilities. CJMS technician worked relatively well through SICL introduction and administration.

[redacted] (Continued)

In all, [redacted] responded most positively to the system, realizing early its potential. Staff counselors initiated the system's use as a selection tool for acceptance or rejection to training classes. Staff members also conducted client analysis, interpreting computer printouts and counseling clients with Cleff information as a base. [redacted] Sr. Counselor at this office, has a firmly established posture as to his response to the system. By request, [redacted] has received additional guidance and instruction in the periphery of the Cleff System and I can feel confident he can effectively utilize the system in those areas normally entertained by community service agencies. Additionally, [redacted] has expressed his awareness that time was their enemy; that his office, too, had work loads far too heavy for effective involvement in the Cleff project. Despite these handicaps, the San Jose office processed a significant number of SICL's. Cooperation and participation was as high as could be expected under the circumstances.

JOCL introduction and participation had some initial schedule conflicts, but job developers made necessary adjustments, opening avenues to good, solid JOCL instruction. Enthusiasm and interest flowed smoothly from counselor phase to job developer phase. Again, normal SER assignments and responsibilities severed additional involvement of job developers in JOCL acquisition, minimizing their roles to that of occasionally establishing initial contacts and supplementing information available to Ultrasystems personnel about those contacts.

Business and industry generally responded well to the research project. The acquisition of JOCL appointments was largely routine. There were, naturally exceptions. All things considered, acquisition of JOCL's at this location should continue at an acceptable level.

SUMMARY

Wherein one of our objectives was to provide the SER Project Offices an opportunity to work with the CJMS to assess its effectiveness and usefulness in their operations, I don't believe the offices allotted enough time for CJMS involvement to make such an assessment. Had there been a better understanding initially between Ultrasystems and the SER Project Offices to outline and detail the interrelation of both entities as related to this evaluation, better time constraints would have been established. A large portion of the confusion is attributed to the local office directors being unaware of the degree of involvement required on the part of their staff members. The San Jose office personnel will render the most significant data relative to reactions and opinions of the CJMS. Additionally, the depth of their involvement will maximize your dependent variables. In commenting on the advantages of using CJMS, I see them as being no different than those advantages experienced in Newark. The system, when properly implemented, will ideally confirm savings in cost, time, and improvement on job matches. I don't think the system is as "tough" as it may have to be to survive in a realistic atmosphere. To be effective, the system would either have to undergo stringent change to "toughen" itself for handling in a less sensitive atmosphere, or, if allowed to go unchanged, be implemented under close scrutiny and supervision of qualified personnel. The current system with improper implementation is, in my estimation, too sensitive to survive long enough to provide valid data upon analysis. The SER organization is well qualified in terms of types of organizations, to benefit from CJMS usage. Used as selection criteria for training, used as a counseling tool, used as a job matching mechanism, SER could save on cost and time in those areas, and improve on the results of all three. To be aware of this potential saving, however, the organization will have to set aside time to get involved and properly evaluate the system.

EXHIBIT 4-3

In administering the SICL, my greatest concern has been the experience portion of the questionnaire. While a very few people caught on quickly and had little trouble relating the activities to their personal lives, the majority found this confusing, some to a great extent. Frequently an individual would be able to relate the activities to his work experience only with constant interpretation on my part. If the SICL was being administered to a large group, this was impossible. Therefore, the validity of the experience questionnaire was sometimes doubtful.

In general, the preference section was much more easily understood by most people. One thing I noticed, however, was that items representing the same category or different pages sometimes seemed very dissimilar and therefore drew opposing reactions. Perhaps this was intentional, in an effort to represent the wide variations within a category, but I wondered if varying reactions might not tend to cancel each other out at times and then register as neutral.

The only other comment I have regarding the SICL itself is regarding the Spanish translations. I was told there have been several revisions of it and that Spanish-speaking people in the east helped work on it, but according to the Mexican trainees who took it here, many of the items were poor translations. I think this is due to idiomatic expressions included, which vary from culture to culture (Puerto Rican, Mexican, South American, etc.). In certain instances students had no idea what a particular phrase meant.

Along these lines, my Spanish is not fluent, and although I had Spanish-speaking teachers helping me there might have been more problems in comprehension than I was aware of.

EXHIBIT 4-3 (continued)

In regard to the cooperating staff at SER, although everyone was pleasant, I'm nto sure how seriously they took the SICL. Results were sometimes received with great interest, and at other times with very little. I also wondered how well informed the various staff members were regarding the whole project, as I was frequently asked questions concerning its purpose, use of results, what various staff members were required to do, etc. These were really out of my territory and authority and I regularly suggested they contact Ron or Arnold, or wait until their next visit.

So far I have specific information about job placement for only 19 trainees. Of course, a large number of those who took the SICL are still in English classes. As more results come in, I will send them on.

I hope these comments help. If I can be more specific, let me know.

5.0 ANALYSIS OF THE DATA OBTAINED FROM THE SER/CLEFF EXPERIMENT

This section presents the data obtained from the SER/Cleff experiment and the analyses undertaken. The section has been divided into four subsections as follows:

- Client Demographic Data (Section 5.1)

  This subsection will present the client demographic data for the 142 clients included in the retention followup data base. This data will be compared to data showing the demographics of SER clients.

- Job Description Data (Section 5.2)

  This subsection will present data describing the jobs that were profiled.

- Client and Job Cleff Indice Data and Analysis (Section 5.3)

  This subsection will present data showing the distribution of client and job scores for the 142 clients and 110 job profiles included in the analysis. The statistical analyses completed using this data will be presented.

- Retention Analysis (Section 5.4)

  This subsection will present the retention data obtained and the analyses performed relating the Cleff system scores to the job retention data.

There is no data presented about all the clients who took SICLs, about their SICL scores, and the services provided by SER. In other words, all the data and analyses presented in this section relate to the 142 clients whose retention was tracked and the 110 job profiles which were obtained.

Table 5-1 presents some summary data to give the reader a feel for the data base before the detailed data and analyses are presented. The data presented in this table shows the following:

1) A total of 571 people took one or both SICLs. Of this, 142 clients were included in the experimental data base. As of October 31, 1973, 303 of these 571 people had been placed. This is the last time at which Ultrasystems reviewed the SER case files for placement data. The outcomes of the other people who took the SICLs is not known.

TABLE 5-1

SUMMARY DATA REGARDING THE SER/CLEFF EXPERIMENT

SUMMARY DATA	SER AGENCY CODE NUMBER				Total	% of Total[1]
	1	2	3	4		
1. Total People Profiled	89	193	139	150	571	
2. Total Included in the Retention Data Base	35	42	28	37	142	[24.9%]
3. Total Hired Per SER Records as of Oct.31,1973	75	76	71	81	303	[53.1%]
4. Number of Job Profiles Used in Analyses	30	29	24	27	110	
5. Number of Individual Employers at which Profiles Were Obtained	27	28	20	25	100	
6. Cumulative Number of People in Data Base Terminated as of Retention Followup Time:						
December 30,73	11	31	12	13	67	(47.2)
Febr. 28, 74	12	34	15	19	80	(56.3)
May 31, 74	14	35	17	20	86	(60.6)
December 10,74	17	36	18	23	94	(66.2)
7. Number & Percent of People in Data Base Who Completed Both SICLs	27 (77%)	34 (81%)	21 (75%)	28 (76%)	110	(77%)

[1] Percentages in square brackets use the total of 571 clients (who took at least one SICL) as the denominator. Percentages in parentheses use the 142 clients included in the experimental sample as the denominator.

TABLE 5-1 (continued)

SUMMARY DATA REGARDING THE SER/CLEFF EXPERIMENT

SUMMARY DATA	SER AGENCY CODE NUMBER					
	1	2	3	4	Total	% of Total
8. Mean Cleff Indices:						
CAI	49.6	38.3	22.7	34.6	37.1	
CDI	939.3	1211.7	1468.0	1525.8	1273.3	
JMI	33.2	25.6	27.0	30.9	29.1	
JDI	1999.3	2242.4	1856.4	2439.6	2157.8	
9. Number of Clients Who Terminated by Calendar Days Worked						
≤30	4	16	3	5	28	(19.7)
31 - 60	2	4	2	2	10	(7.0)
61 - 90	3	2	1	3	9	(6.3)
91 - 120	0	2	3	2	7	(4.9)
121 - 199	2	9	5	4	20	(14.1)
200 - 584 (longest last termination)	6	3	4	7	20	(14.1)
Total Terminations	17 (48.6)	36 (85.7)	18 (64.3)	23 (62.2)	94	(66.2)

2) Of the 142 people in the experimental data base, 110 took both SICL booklets (77%).

3) As of the last retention followup (December 10, 1974), 94 of the 142 people had terminated (66.2%). Twenty-eight terminated after working 30 or less (calendar) days (approximately 30% of all the terminations), and 47 people terminated after working 90 or less (calendar) days (50% of all terminations).

   Therefore, as of December 10, 1974, 48 people were still working (33.8%).

4) The mean client adjustment and difference indices (for the 110 people who took both SICLs) were +37.1 and +1273.3, respectively.

5) The mean job match and difference indices for the experimental sample were +29.1 and +2157.8, respectively.

   (NOTE: The values for the client adjustment and job match indices (which are correlation coefficients) are sometimes given as 100 times the correlation coefficient value. Thus, a client adjustment index may be given as +.5 or +50.)

5.1 CLIENT DEMOGRAPHIC DATA

Table 5-2 presents some demographic data distributions for the experimental sample of 142 people. Table 5-3 presents like demographic data distributions obtained from SER Management Information System (MIS) reports covering the 8-1/2 month period ending May 31, 1973.

The data presented in Table 5-2, covering the experimental sample, was obtained from the SER MIS forms discussed earlier. Ultrasystems did not compile an independent data base of demographic characteristics pertaining to the people who took the SICLs. Instead, the experiment relied on the forms used by SER to record applicant characteristics and services rendered. As the data in Table 5-2 clearly indicates, we failed to obtain a complete set of data for all the people in the experimental data base. The entries marked INA (Information Not Available) are due either to no entry for this data item on the SER forms we obtained or to our failure to obtain the particular form with this data item recorded. Whereas the demographic data is unfortunately and embarrassingly incomplete, it does give a reasonable picture of the characteristics of the people in the experimental sample. Before discussing the data distributions, there are some points that should be made to clarify the meaning of some of the data items presented and to describe the manner in which the data is presented. These points are as follows:

- The two tables are constructed essentially in the same format and contain the same data items. Table 5-2 pertains to the experimental sample, whereas Table 5-3 pertains to the cumulative enrollment of each of the four SER offices involved in the experiment over an 8-1/2 month time period ending on May 31, 1973. The experimental data group does not consist entirely of enrollees; i.e., there are some people in the sample who were never enrolled in any SER training programs but who did receive job referral services resulting in a placement. Because our data is not complete, we cannot state exactly what percentage of our sample were enrollees. There are six people about whom we have no demographic or SER service data at all. Of the remaining 136, we definitely know that 111 were enrollees and we believe four were direct job entries (non-enrollees placed by SER). For the remaining 21, we have demographic data but no data that would enable us to determine if they were enrollees. Thus, we can definitely state that at least 78% of our experimental sample were enrollees. Because Table 5-3 shows the data only for enrollees, one should be careful in interpreting comparisons between the two tables.

TABLE 5-2

SUMMARY OF SER EXPERIMENTAL GROUP CHARACTERISTICS

	SER AGENCY CODE NUMBER					
	1	2	3	4	Total	% of Total
Total in Sample (Percent of Sample)	35 (24.6)	42 (29.6)	28 (19.7)	37 (26.1)	142	(100)
Characteristics						
Sex: Male	13 (37.1)	12 (28.6)	8 (36.3)	19 (51.4)	52	(38.2)
Female	22 (62.8)	30 (71.4)	14 (63.6)	18 (48.6)	84	(61.8)
INA	0	0	6	0	6	[4.2]
Ethnic:						
Mexican-American	22 (62.8)	32 (80.0)	20 (90.9)	28 (75.7)	102	(76.1)
Cuban	0	0	0	0	0	(0)
Puerto Rican	0	2 (5.0)	0	1 (2.7)	3	(2.2)
Other Spanish	13 (37.1)	2 (5.0)	1 (4.5)	3 (8.1)	19	(14.2)
Afro American	0	1 (2.5)	0	3 (8.1)	4	(3.0)
Anglo American	0	2 (5.0)	0	1 (2.7)	3	(2.2)
American Indian	0	1 (2.5)	1 (4.5)	0	2	(1.5
Other	0	0	0	1 (2.7)	1	(0.7)
INA	0	2	6	0	8	[5.6]
Age:						
18 & Under	6 (17.1)	8 (20.0)	5	10	29	(21.6)
19-21	13 (37.1)	11 (27.5)	6	9	39	(29.1)
22-32	12 (34.3)	13 (32.5)	11	15	51	(38.0)
33-44	3 (8.6)	5 (12.5)	0	3	11	(8.2)
45 & Over	1 (2.8)	3 (7.5)	0	0	4	(3.0)
INA	0	2	6	0	8	[5.6]
Average	24.11	25.7	21.8	23.1	23.9	
Education (Stated)						
4th or Less	0	2	0	0	2	(1.6)
5th-7th	0	3 (7.7)	2 (9.5)	2 (6.1)	7	(5.5)
8th	3 (8.8)	2 (5.1)	2 (9.5)	3 (9.1)	10	(7.9)
9th-11th	19 (55.9)	21 (53.8)	12 (57.1)	18 (54.5)	70	(55.1)
12th & Over	12 (35.3)	11 (28.2)	5 (23.8)	10 (30.3)	38	(29.9)
INA	1	3	7	4	15	[10.6]
Average	10.9/34	10.2/39	10.4/21	11.0/33	10.4/127	

TABLE 5-2 (continued)

SUMMARY OF SER EXPERIMENTAL GROUP CHARACTERISTICS

	SER AGENCY CODE NUMBER					
	1	2	3	4	Total	% of Total
Total in Sample	35	42	28	37	142	(100)
Characteristics						
Education (Functional):						
6th or Less	INA	7	INA	INA		
7th-9th	INA	16	INA	INA		
10th & Over	INA	0	INA	INA		
INA	35	19	28	37	119	[83.8]
Average	INA	7.23/23	INA	INA		
Disadvantaged (Yes)	25 (71.4)	38 (90.5)	19 (67.8)	30 (81.1)	112	(78.9)
INA	10	4	9	7	30	
Public Assistance Recipient (Yes)	4	7	5	9	25	(17.6)
(No)	25	33	17	25	100	
INA	6	2	6	3	17	[12.0]
Heads of Family or Household						
Yes	20	26	11	25	82	(61.6)
No	14	14	11	12	51	(38.3)
INA	1	2	6	0	9	[6.3]
Monolinguals						
Yes	12	5	6	11	34	(29.3)
No	14	35	14	19	82	(70.7)
INA	9	2	8	7	26	[18.3]
Migrant Yes	2	2	6	3	13	(9.2)
No	4	37	14	24	79	
INA	29	3	8	10	50	[35.2]

TABLE 5-2 (continued)

SUMMARY OF SER EXPERIMENTAL GROUP CHARACTERISTICS

	SER AGENCY CODE NUMBER					
	1	2	3	4	Total	% of Total
Characteristics						
Citizenship or Permanent Resident:						
Citizen	6	30	9	13	58	(43.3)
Perm.Resident	8	5	6	6	25	(18.6)
Yes	10	4	5	13	32	(23.9)
Resident	10	1	1	3	15	(11.2)
No	1	0	1	2	4	(3.0)
INA	0	2	6	0	8	[5.6]
Employment Status						
Employed	3	1	3	4	11	(8.7)
Underemployed	2	0	4	1	6	(4.7)
Unemployed	27	39	14	29	109	(85.8)
INA	3	2	7	3	15	[10.6]

TABLE 5-3

SUMMARY OF SER ENROLLEE CHARACTERISTICS

Cumulative Statistics (Time Period 9-18-72 to 5-31-73: 8.5 months)

	SER AGENCY CODE NUMBER					
	1	2	3	4	Total	% of Total
Total Enrollment (Percent of 4 Agency Total	288 (22.0)	333 (25.4)	298 (22.7)	392 (29.9)	1311	(100)
Characteristics						
Sex: Male	133 (46.2)	103 (30.9)	191 (64.1)	176 (44.9)	603	(46)
Female	155 (53.8)	230 (69.1)	107 (35.9)	216 (55.1)	708	(54)
Ethnic:						
Mexican-Amer.	176 (61.1)	239 (71.8)	270 (90.6)	295 (75.2)	980	(74.8)
Cuban	9 (3.1)	17 (5.1)	1 (0.3)	2 (0.5)	29	(2.2)
Puerto Rican	14 (4.9)	6 (1.8)	1 (0.3)	5 (1.3)	26	(2.0)
Other Spanish	85 (29.5)	17 (5.1)	8 (2.7)	16 (4.1)	126	(9.6)
Afro-American	0	16 (4.8)	3 (1.0)	17 (4.3)	36	(2.7)
Anglo-American	3 (1.0)	29 (12.7)	8 (2.7)	41 (10.4)	81	(6.2)
American Indian	0	3 (0.9)	2 (0.7)	6 (1.5)	11	(0.8)
Other	1 (0.3)	6 (1.8)	5 (1.7)	10 (2.6)	22	(1.7)
Age:						
18 and Under	24 (8.3)	60 (18.0)	38 (12.8)	51 (13.0)	173	(13.2)
19-21	81 (28.1)	88 (26.4)	82 (27.5)	126 (32.1)	377	(28.8)
22-32	136 (47.2)	114 (34.2)	131 (44.0)	167 (42.6)	548	(41.8)
33-44	37 (12.8)	59 (17.7)	39 (13.1)	42 (10.7)	177	(13.5)
45 and Over	10 (3.5)	12 (3.6)	8 (2.7)	6 (1.5)	36	(2.7)
Education (Stated):						
4th or Less	6 (2.1)	12 (3.6)	11 (3.7)	4 (1.0)	33	(2.5)
5th-7th	19 (6.6)	26 (7.8)	61 (20.5)	30 (7.6)	136	(10.4)
8th	16 (5.6)	21 (6.3)	15 (5.0)	20 (5.1)	72	(5.5)
9th-11th	127 (44.1)	134 (40.2)	121 (40.6)	188 (48.0)	570	(43.5)
12th and Over	120 (41.7)	140 (42.0)	90 (30.2)	150 (38.3)	500	(38.1)
Education (Functional):						
6th or Less	156 (54.2)	165 (49.5)	INA	INA	321	(51.7)
7th-9th	132 (45.8)	143 (42.9)	INA	INA	275	(44.3)
10th and Over	0	25 (7.5)	INA	INA	25	(4.0)

TABLE 5-3 (continued)

SUMMARY OF SER ENROLLEE CHARACTERISTICS

Cumulative Statistics (Time Period 9-18-72
to 5-31-73: 8.5 months)

	SER AGENCY CODE NUMBER					
	1	2	3	4	Total	% of Total
Characteristics						
Disadvantaged	288 (100.0)	299 (89.8)	296 (99.3)	384 (98.0)	1267	(96.6)
Heads of Family or Household	114 (39.6)	227 (68.2)	234 (78.5)	272 (69.4)	847	(64.6)
Public Assistance Recipients	10 (3.5)	99 (29.7)	74 (24.8)	97 (24.7)	280	(21.4)
Monolinguals	74 (25.7)	65 (19.5)	114 (38.2)	71 (18.1)	324	(24.7)
Vietnam Era Vets	6 (2.1)	19 (5.7)	16 (5.4)	28 (7.1)	69	(5.3)
Migrant	0	17 (5.1)	93 (31.2)	0	110	(8.4)

- Each of the two tables shows the demographic distribution for each of the four SER agencies separately and then intoto across all four. The percentages in the columns under each agency are the percent of that agency's experimental group that were characterized by the particular value of the demographic characteristic. All percentages shown in the curved parentheses are adjusted percentages; i.e., they are based not on the total agency sample but on the number of people for whom we have a value for that characteristic. In other words, the INA counts are excluded prior to the calculation of the percentages.[1] In the % of Total column, the percentages shown in the square brackets for the total INA counts are the percent of the total experimental group for which the particular characteristic's value is not known, i.e., the percent of INA's.

- Most of the demographic characteristic data items are self-evident. A few deserve to be defined (the definitions are taken from the SER MIS manual).

HEAD OF FAMILY OR HOUSEHOLD	Check "Yes" if the applicant normally, when employed, is primarily responsible for the support of one or more members of his family, or if the person is regarded as the head of household by its members. Otherwise, check "No."
PUBLIC ASSISTANCE RECIPIENT OR UNEMPLOYMENT INSURANCE CLAIMANT	Check "Yes" if at the time of the interview the applicant was receiving financial aid under the following categories: --Old Age Assistance (Title I) --Aid to Families with Dependent Children (Title IV) --Aid to the Blind (Title X) --Aid to the Permanently Disabled (Title XIV) --Aid to the Aged, Blind, or Disabled (Title XVI)

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[1] There are three exceptions to this. These are the total percentages given for disadvantaged, public assistance recipient, and migrant, where the percent of Yes responses is given in relation to the total experimental sample, i.e., the 142 people.

--Any other Federal, State, or local public assistance program. (Do not include surplus food, food stamps, assistance from private, voluntary agency, pensions, or old-age and survivor's insurance benefits).

--If the applicant is uncertain about the source of any aid he is receiving, the interviewer should check with the counselor who is making the determination of the applicant's eligibility for a training allowance.

A youth whose parent(s) is receiving AFDC, or other State or local aid, is to be checked "Yes" if his needs are considered in computing a public assistance grant to his family.

Check "Yes" if the applicant is claiming Unemployment Insurance benefits at the time of the interview.

If the answer is "Yes," then specify which one, otherwise check "No."

MONOLINGUAL	Check "Yes" if the applicant speaks Spanish but has a limited English-speaking ability which severely limits his opportunities for meaningful employment. English-speaking ability refers to the ability to converse in English and to understand spoken English; a person should not be included in this category because of ignorance of proper grammar.
MIGRANT	Check "Yes" if the applicant is a migrant farmworker. A migrant farmworker is a person who left his home temporarily overnight to do farm work within the same State or who had no usual place of residence and did farm wage work in two or more counties during the year.
EMPLOYMENT STATUS	Check only the most appropriate item to indicate the applicant's present status. Employed--Check employed if the applicant did work as a paid employee, in his own

	business, or on a farm, or worked at least 15 hours during the past week as an unpaid worker in a family enterprise. Check employed also if the applicant was absent from work because of illness, vacation, bad weather, labor-management dispute, or other personal reason. Do not include those whose activity consisted of volunteer work for religious or other charitable organizations.
	Underemployed--Check if the applicant is working less than full time in his occupation for economic reasons such as slack work, material shortage, plant repairs, etc., or has received notice that he will be employed less than full time for economic reasons, or he is working below his skill capacity, or has received notice that he will be unemployed because his skills are becoming obsolete.
	Unemployed--Check if the applicant is a civilian who has no employment, who is available for work, and who has engaged in job seeking activity such as: registering at a public or private employment office, meeting with prospective employers, checking with friends or relatives, placing or answering advertisements, or being on a union or other register. Also, include an applicant waiting to be called back to a job from which he had been laid off, or an applicant waiting to report to a job scheduled to begin in the following 30 days. Students who are seeking vacation jobs or work outside of school hours are also considered unemployed. Persons registering through any manpower program will be considered unemployed, and though the application may be made for training rather than an immediate job.
DISADVANTAGED	A disadvantaged individual, for Manpower Program purposes, is a poor person who does not have suitable employment and who is either 1) a school dropout, 2) a member of a minority, 3) under 22 years of age, 4) 45 years of age or over, or 5) handicapped.

The functional education level is obtained from the tests administered to prospective enrollees during Assessment and Orientation.

If one refers back to the SER form S-1 shown in Section 4, one sees that the entries Head of Household, Public Assistance Recipient, Monolingual, and Migrant are Yes/No entries. When no value was checked, we classified the response as INA. The Monolingual distributions shown in Table 5-2 included special cases where the entry given on the S-1 was neither Yes nor No. These special entries were "marg," which we took to mean marginal, and coded as "Yes" and "Bi," which we took to mean "Bilingual" and coded as "No." It is important to note that the definition for Monolingual given above refers to speaking ability and not to reading or writing ability.

The data shown for Head of Household was taken on face value based on the Yes/No entry for this item. It is Ultrasystems' opinion that this entry is not clearly understood by most of the applicants. The S-1 form contains other entries giving family size, number of dependents, and marital status. While these are not given in Table 5-1, our examination reveals many inconsistencies between these entries and the answer given regarding Head of Household.

The data for the entry on the S-1 form for Citizen or Permanent Resident is structured as a Yes/No answer, where if the answer is Yes then the appropriate answer is to be specified. The data shown in Table 5-2 is as it was recorded on the S-1 forms. Thus, the answer Yes appears with no specification.

Comparing the data in the two tables shows that in general the experimental sample is comparable to the cumulative enrollee characteristics. There are several differences, as follows:

1) The experimental sample contains a larger percentage of women than comprise the cumulative SER enrollee population.

2) The experimental group has a larger distribution in the 18 and Under and 19-21 year-old age groups and smaller percentages in the older groups. Whereas no average age is available from the SER Cumulative Enrollment data, it appears that the experimental group is younger than the cumulative enrollee population.

3) The experimental group has a smaller percentage of its population in the two lowest educational classes (education as stated) and in the highest. The percent of the experimental sample with at least some high school is slightly greater than the cumulative enrollee population (85% as compared to 81.6%).

   Table 5-4 shows the Stated Education distribution as a function of the country of the school last attended. The adjusted percent distribution shows that for the 122 people whose education level and country is known 68% last attended school in the United States; 23% in Mexico; and the remaining 9% in Central and South America. Because of the large percentage of people who were educated outside the United States, care must be taken in interpreting this data item, especially since the corresponding distribution for the cumulative enrollee population is not known.

4) The remaining comparable characteristics are in reasonably close agreement with the exception of the percent of the two populations classified as disadvantaged. Ultrasystems believes the apparently lower percentage of disadvantaged people in the experimental sample is due to the lack of complete information in our data base.

Table 5-5 presents data showing the number of new applicants and new enrollees for the three months of March, April, May 1973 and over the 8-1/2 month period ending May 31, 1973. The bulk of the SICLs administered as part of this project were done in this three month time period, while the majority of those done in June were completed by enrollees. The data in this table indicates that approximately 20% of the total people who could have potentially taken the SICLs actually did so.

TABLE 5-4

DISTRIBUTION OF HIGHEST GRADE COMPLETED (EDUCATION), AS STATED, AS A FUNCTION OF THE COUNTRY OF THE LAST SCHOOL ATTENDED

	Country of Last School Attended									
Education As Stated	USA	Mexico	Ecuador	Chile	Columbia	Guatemala	Brazil	El Salvador	Peru	INA
4th or Under	1	1	0	0	0	0	0	0	0	0
5th-7th	0	5	0	0	0	0	0	0	0	2
8th	4	4	0	0	1	0	0	1	0	0
9th-11th	55	11	1	1	0	0	0	0	1	1
12th & Over	23	7	3	0	1	1	1	0	0	2
INA	2	2	0	0	0	0	0	1	0	10
Total	85	30	4	1	2	1	1	2	1	15
Total Known Grade Level	83	28	4	1	2	1	1	1	1	5
Percent of Known Total	(68.0)	(23.0)	(3.3)	(0.8)	(1.6)	(0.8)	(0.8)	(0.8)	(0.8)	[3.9]

TABLE 5-5

SUMMARY SER OFFICE
APPLICANT AND ENROLLMENT VOLUMES

Applicant & Enrollee Volumes as Defined	SER AGENCY CODE NUMBER				
	1	2	3	4	Total
Total Applicants					
March 1973	206	169	305	165	845
April 1973	164	138	225	138	665
May 1973	155	117	275	189	736
Total	525	424	805	492	2246
3 Month Average	175	141	268	164	749
Cum. Total thru May 31, 1973	1572	1675	2192	1673	7112
Months Average	185	197	258	197	837
Enrollees					
March	63	21	4	37	125
April	23	26	45	32	126
May	20	24	21	74	139
Total	106	71	70	143	390
3 Month Average	35	24	23	48	130
Cumulative thru 5-31-73	288	333	298	392	1311
Months Average	34	39	35	46	154
Enrollment at Start of March 1973	77	98	94	120	389
Enrollment at End of May 1973	64	58	106	104	342

5.2 JOB AND JOB PROFILE CHARACTERISTICS

A total of 110 individual job profiles were administered based on the jobs obtained by the 142 people who comprise the experimental sample. The difference in the two numbers is due to the fact that in 21 instances more than one person was placed into the same type of job at the same employer. The maximum number of people placed in a single type of job at a given employer was 5. The 110 job profiles were obtained at 100 separate employers. Table 5-6 presents job and job profile characteristic data for these 110 job profiles. The table presents the following data:

- The JOCL number assigned by Ultrasystems. The first digit identifies the agency who referred the people to this job.
- The job title as given by the employer.
- The type of company as defined by Ultrasystems based on the information obtained during the JOCL administration. Manufacturing companies are identified by the products produced at the physical plant where the person was working. Non-manufacturing companies are identified by the services provided.
- DOT code assigned by Ultrasystems based on the job description obtained from the employer.
- The wages paid the person (or persons) placed at the time of the placement. All wages have been converted to dollars per hour.
- The number of the job profile cluster that best "matches" the JOCL profile obtained. Each JOCL was correlated with the 19 job cluster profiles contained in the CJMS Cluster Register. The "best matched" cluster is the one which has the highest correlation with the profile obtained. The correlation coefficient is also shown.
- The number of experimental group clients placed into the job profiled. A number is given only when there is more than one person placed into a particular job at a particular company; i.e., all the jobs without a number in this column had only one person placed.

TABLE 5-6. CHARACTERISTICS OF JOBS AND JOB PROFILES

JOCL #	Employer Job Title	Type of Company	DOT Code	Wages Dollars/Hour	Cluster Number	Cluster Match Index	Number of Placements
1001	Mail Clerk/Typist	Auto Parts Mfg.	237.368	3.06	12	84	
1002	Cashier	Grocery Store	211.368	2.67	6	63	
1003	MTST Operator	Teaching Manuals Publisher	203.582	2.88	9	80	
1004	Warehouseman	Wig Warehouse	922.887	2.50	11	74	2
1005	Floor Messenger	Insurance	230.878	2.25	17	80	
1006	Accounting Clerk	Insurance	210.388	2.57	12	76	
1007	File Clerk	Insurance	206.388	2.23	11	87	
1008	General Clerk	Telephone Co.	209.388	2.97	12	82	
1009	General Clerk	Telephone Co.	209.388	2.97	12	83	
1010	Food Service Worker	Airline	315.381	4.00	17	83	
1011	Secretary	Health Center	201.368	2.89	11	82	2
1012	File Clerk	Insurance Group	206.388	2.50	11	76	
1013	Parking Attendant	Parking Lot	915.878	2.25	3	80	
1014	Machine Operator	Lock Assembly Mfg.	649.885	2.50	14	84	
1016	Intermediate Clrk./Typist	Hospital	209.388	3.18	12	84	
1017	Machine Adjuster	Envelope Mfg.	641.780	3.19	5	90	
1018	Sales Clerk	Men's Department Store	290.468	2.25	6	67	
1019	Janitor	Auto Part Rebuilding	382.884	2.50	18	82	
1021	File Clerk	Insurance	206.388	2.38	11	90	
1023	Bank Teller	Bank	212.368	2.45	12	87	
1024	Face Sheet Clerk	Social Service Dept.	209.388	3.18	12	86	2
1025	Sub-assembler	Resistor Assembly	729.884	2.70	5	81	
1026	Frameman	Telephone Co.	222.884	4.67	7	68	2
1027	General Clerk	Credit Verifying Service	209.388	2.25	1	88	2
1028	Salesman	Electrical Sales Supply	278.358	2.50	6	74	
1029	Stock Clerk/Delivery	Drug Store	223.387	2.50	8	84	
1030	Data Entry Operator	School District	231.582	3.18	12	82	
1031	Keypunch Operator	Insurance	231.562	3.18	12	80	
1032	Clerk Typist II	Dept. of Motor Vehicles	209.388	2.79	12	89	
1033	Teller	Bank	212.368	2.45	6	93	

TABLE 5-6 (continued)

JOCL #	Employer Job Title	Type of Company	DOT Code	Wages Dollars/Hour	Cluster Number	Cluster Match Index	Number of Placements
2001	Foreman	Disposal Service	619.130	3.75	2	78	
2002	Clerk Typist	Engr./Heavy Construction	209.388	2.54	12	93	
2003	Utility Man	Engr./Mfg. Flight Controls	381.887	2.80	18	96	
2005	Clerk Typist	Yacht Mfg.	209.388	2.50	12	81	
2006	Mech. Assembler	Electronics Mfg.	726.781	2.00	12	74	
2007	E/M Assembler	Computer Mfg.	726.781	2.35	9	86	3
2008	Repairman	Vacuum Service	723.084	3.60	5	83	
2009	E/M Assembler	Electrical Connectors Mfg.	726.781	2.15	12	71	3
2010	Seamstress	Garment Mfg.	785.381	2.00	12	82	
2011	E/M Assembler	Switch Mfg.	726.781	2.25	12	88	5
2012	E/M Assembler	Tape Recorder Mfg.	726.781	2.50	12	86	2
2014	Directory Asst. Operator	Telephone Co.	235.862	2.80	1	89	
2015	Furniture Assembler	Furniture Mfg.	763.884	2.50	15	83	
2018	Welder Trainee	Specialty Metal Equip. Mfg.	812.884	2.00	18	83	
2019	Community Aide I	Welfare Office	194.168	2.48	3	51	
2021	Receptionist	Guitar Mfg.	237.368	2.40	1	62	
2022	Finisher	Fishing Rod Mfg.	739.884	2.40	12	82	
2024	Assembler	Battery Mfg.	726.781	2.25	16	83	
2025	Inspector	Battery Mfg.	727.687	2.50	14	77	
2026	Elec. Assembler	Printed Circuit Board Mfg.	726.781	2.20	12	88	
2027	Clerk Typist	Gas Meter Mfg.	209.388	2.70	12	78	2
2028	Gardener	Land Developers	407.884	3.00	15	84	
2029	Clerk	Insurance	209.388	2.45	1	91	
2030	Credit Verifier	Bank	191.268	2.31	12	90	
2032	Accts. Receivable	Yacht Mfg.	219.488	2.50	7	59	
2033	Flex-O-writer Operator	Instrument Mfg.	203.588	2.50	12	79	
2034	Outreach Community Worker	Community Service	195.168	2.00	3	56	
2035	Assembly Operator	Radio Mfg.	726.781	2.71	12	93	
2036	General Assembler	Mobile Home Mfg.	806.884	2.95	18	72	4

TABLE 5-6 (continued)

JOCL #	Employer Job Title	Type of Company	DOT Code	Wages Dollars/Hour	Cluster Number	Cluster Match Index	Number of Placements
3001	Office Trainee	Produce Distributor	209.388	2.25	12	85	
3002	File Clerk	Insurance	206.388	INA	11	80	
3003	Shipfitter Helper	Steel Co.	806.887	3.79	15	86	2
3004	Layout Helper	Steel Co.	801.887	3.94	9	65	
3005	Counter Girl	Muffler Shop	243.368	2.00	1	89	
3006	Teller Trainee	Bank	212.368	2.27	11	80	
3007	Computer Clerk Trainee	Bank	213.382	2.27	12	82	
3008	Office Trainee	Produce Wholesaler	209.388	2.00	12	93	
3009	Statement Clerk	Bank	209.388	1.93	11	82	
3010	Accounting Clerk	Lumber Company	219.488	2.88	12	63	
3011	Auto Electrician	Auto Repair	721.281	2.50	16	82	
3012	Truck Driver	Shipping	905.883	4.43	8	65	2
3013	Seamstress	Upholstery Shop	785.381	2.40	16	72	
3014	Trimming Assembler	Upholstery Shop	780.684	2.40	15	73	2
3015	Mechanic Trainee	Motor Repair	620.281	2.25	9	69	
3016	Truck Painter Helper	Auto Body Repair	845.781	2.25	18	80	
3018	Doctor Assistant	Medical Clinic	079.378	1.65	10	55	2
3019	Receptionist	Medical Clinic	237.368	1.65	1	93	
3020	Electronic Assembler	Calculating Machines Mfg.	726.781	1.65	9	84	
3021	Shop Worker	Mold Casting	709.887	1.75	15	58	
3022	Machinist Apprentice	Motor Repairs/Supply	600.280	2.30	15	86	
3023	Shop Helper	Metal Finishing	705.885	2.00	16	82	
3024	Operator Apprentice	Tank Cleaning	891.887	3.40	18	85	
3026	File Clerk	Bank	206.388	2.08	11	88	

TABLE 5-6 (continued)

JOCL #	Employer Job Title	Type of Company	DOT Code	Wages Dollars/Hour	Cluster Number	Cluster Match Index	Number of Placements
4001	Masking Operator	Electronics Mfg.	920.782	2.35	12	90	
4005	Parking Lot Attendant	Parking Lot	915.878	2.00	11	78	
4006	File Clerk	Saving & Loan	206.388	2.45	12	89	
4007	File Clerk	Insurance	206.388	2.31	11	89	
4008	File Clerk	Hospital	206.388	3.40	11	69	
4009	Assembler	Truck Assembly	806.887	3.50	16	89	
4010	Labeling Clerk	Garment Mfg.	229.887	2.00	7	76	
4011	General Office	Meat Co.	209.388	2.31	12	87	
4012	Clerk-Typist	Mfg./Distributor (Labels)	209.388	2.25	1	88	
4013	Clerk-Typist	Employment/Training Agency	209.388	2.56	12	82	
4014	Assembler	Auto Assembly	806.887	4.60	18	87	
4015	Assembler	Electronics Mfg.	726.781	2.55	12	85	
4016	Press Operator	Rubber Products Mfg.	559.885	3.56	16	94	
4017	H.D.T. Operator	Rubber Products Mfg.	556.782	3.56/3.71	16	92	3
4018	Mill Operator	Rubber Products Mfg.	599.885	3.50	18	81	3
4019	Misc. Bundler	Paper Co.	920.887	4.20	15	82	2
4020	Upholsterer Trainee	Upholstery	780.884	3.25	18	81	
4022	Prep./Finish Operator	Film Processing Lab	976.886	2.92	12	84	4
4024	Process Equip. Operator	Electronics Mfg.	559.885	2.88	16	87	
4025	Underground Construction	Underground Cables	869.384	3.50	18	68	
4026	Molding Operator	Electronics Mfg.	556.885	2.63	16	90	2
4027	Fermentation Operator	Chemical Co.	558.782	4.09	15	86	
4028	Bank Proof Operator	Bank	217.388	2.31	12	84	
4029	Microwave Assembler	Microwave Mfg.	726.781	2.60	12	86	
4030	General Winery Worker	Winery	529.886	4.07	17	90	2
4031	Electrical Assembler	Electronics Mfg.	726.781	2.90	9	83	
4032	Electrical Technician	Electronics Mfg.	003.181	3.25	5	79	

The distribution of the JOCL-Cluster correlation coefficients shows that 31 of the 110 JOCLs had correlation coefficients less than +80 (or + .80). The mean JOCL-Cluster correlation coefficient was +81. The range was from +51 to +96. The low value of the mean correlation coefficient and the large number of JOCLs with cluster match correlations below +80 is troublesome. The introduction to the CJMS Cluster register states the following:

> "Beneath each cluster profile in the register, a listing of various jobs appears. These jobs were collected and then sorted into the clusters such that the correlation between the specific job profile and the cluster profile would be on the average +.90, and not less than +.80."

The Job Cluster Register (dated October 1971)[1] contains 525 individual job titles distributed as shown in Table 5-7.[1] Table 5-8 shows the cluster distribution of the 110 job profiles obtained as part of the SER/Cleff experiments.

Table 5-8 shows that the 31 job profiles whose cluster match was less than +80 account for 43 of the total 142 placements (30.3%). Comparing the two tables, one sees that the percentage distribution of job profiles across the clusters is quite different. In the experimental sample, almost 32% of the 110 profiles fell under cluster #12, whereas in the Cluster Register, this cluster accounted for 9.7% of the jobs listed.

The basic issue here is whether the JOCL-Cluster correlations obtained for the experimental job profiles are due to a lack of skill in administrating the profiles or are due to "real" differences between the jobs whose profiles were used to create the Cluster Register and those obtained as part of this experiment. In other words, the inclusion of more job profiles in the data base used to create the clusters could lead to different cluster profiles and even to a different number of clusters needed to satisfy the average and minimum profile-cluster correlation criteria. This is a difficult

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[1] The number of job titles was obtained by counting each job title/subtitle/business/DOT code line. (See Part I for an example of the contents of the Cluster Register.) The ADP-PDS final report states that the Cluster Register "is a composite of over 750 entry level up to semi-skilled positions that have been computer analyzed and organized into 19 basic work clusters." The reason for the difference is not known.

TABLE 5-7

DISTRIBUTION OF JOB TITLES IN THE CJMS JOB CLUSTER REGISTER

Cluster Number	Numbers of Job Titles (% of Total)		Number of Job Titles with DOT Code Assigned in Register
1	78	14.9	34
2	8	1.5	5
3	25	4.8	5
4	16	3.0	3
5	19	3.6	6
6	21	4.0	8
7	2	.03	0
8	16	3.0	12
9	16	3.0	9
10	22	4.2	6
11	21	4.0	7
12	51	9.7	4
13	36	6.9	20
14	18	3.4	12
15	45	8.6	13
16	18	3.4	15
17	44	8.4	21
18	68	13.0	54
19	1	.01	1
	525		235

TABLE 5-8

DISTRIBUTION OF DATA BASE JOB PROFILES BY HIGHEST CLUSTER (CORRELATION) MATCH

(Note: Nomenclature is X/Y where X = number of profiles and Y = number whose match index is less than +80)

	SER Agency Number							
Cluster #	1	2	3	4	Totals	Percent of Total	Percent of Total Below +80	Percent of Each Cell Below +.80
1	1	3/2	2	1	7/2	6.4	/ 6.4	28.6
2	0	1	0	0	1/0	0.9	/ 0	--
3	1	2/2	0	0	3/2	2.7	/ 6.4	66.7
4	0	0	0	0	0/0	0	/ 0	--
5	2	1	0	1/1	4/1	3.6	/ 3.2	25.0
6	4/3	0	0	0	4/3	3.6	/ 9.7	75.0
7	1/1	1/1	0	1/1	3/3	2.7	/ 9.7	100.0
8	1	0	1/1	0	2/1	1.8	/ 3.2	50.0
9	1	1	3/2	1	6/2	5.4	/ 6.4	33.3
10	0	0	1/1	0	1/1	0.9	/ 3.2	100.0
11	5/2	0	4	3/2	12/4	10.9	/12.9	33.3
12	10/1	13/4	4/1	8	35/16	31.8	/19.4	17.1
13	0	0	0	0	0/0	0	/ 0	--
14	1	1/1	0	0	2/1	1.8	/ 3.2	50.0
15	0	2	4/2	2	8/2	7.3	/ 6.4	25.0
16	0	1	3/1	5	9/1	8.2	/ 3.2	11.1
17	2	0	0	1	3/0	2.7	/ 0	--
18	1	3/1	2/0	4/1	10/2	9.1	/ 6.4	20.0
19	0	0	0	0	0/0	0	/ 0	--
Totals	30/7	29/11	24/8	27/5	110/31			
Percent less than +80	23.3	37.9	33.3	18.5	28.2			
Number of clients hired into jobs whose cluster correlation is less than +80	9	17	11	6	43			
Percent of client data base	25.7	40.5	39.3	16.2	30.3			

issue and is not really resolvable. The following points should be kept in mind:

1) The JOCLs administered as part of this experiment were done by five people, four of whom were trained by Mr. Ron Harris. Mr. Harris was the other administrator. The 2 X 5 contingency table given below shows the number of JOCLs done by each of the five administrators which resulted in profiles whose cluster correlations were greater than or equal to +80 or less than +80.

JOCL Profile/ Cluster Correlation	JOCL Administrators 1	2	3	4	5	Total
<.80	16	2	9	1	3	31
≥.80	25	7	32	7	8	79
Total	41	9	41	8	11	110

$$\chi^2 = 4.30$$

Since the calculated chi-square of 4.30 is far below the necessary critical value of 9.49 (required for significance at the 95% confidence level), the hypothesis of homogeneity between administrators is substantiated. This, of course, doesn't mean that the JOCL's obtained by the administrators were in fact the "best" for each job.

The JOCLs were obtained over the course of 8 months To determine if there was a learning curve effect (i.e., the low cluster correlated JOCLs occurred in greater proportion early in the administration time period), the following 8 X 2 contingency table was analyzed. The calculated chi-square of 8.77 is far below the necessary critical value of 14.1 (required for significance at the 95% confidence level). Therefore, the hypothesis that low cluster correlation JOCLs were obtained in greater proportions early in the administration period is rejected.

JOCL Cluster/ Profile Correlation	Month When JOCL Was Administered June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total
.80	1	11	1	0	6	6	6	0	31
.80	1	38	5	1	5	7	21	1	79
Total	2	49	6	1	11	13	27	1	

$$\chi^2 = 8.77$$

2) As has been pointed out before, the rules governing the card sort part of the JOCL as utilized by Ultrasystems were different than those specified in the checklist rules.

3) It is Ultrasystems' opinion that the cluster profiles and the number of these profiles obtained from the job profiles used in the generation of the Register is not the final solution representative of all low and semi-skilled jobs. The 19th cluster added to the Register and entitled "Maverick" is an indication that profiles can be obtained which are significantly different than the composite cluster profiles. It does not seem plausible to Ultrasystems that the cluster profiles contained in the Register are in fact representative (in the sense of the correlation criteria) of all the profiles that can be obtained.

4) Only one job profile was obtained for each job. Dr. Cleff has written about the process whereby individual profiles are obtained, for a given job type at a given employer, from more than one job supervisor. The resultant profiles are used to generate a composite profile based on a combination of mathematical actions and discussion among the respondents. This indicates to Ultrasystems what is really obvious; i.e., that individual supervisors will view the same job differently. This is in addition to the differences that will occur in the interpretation of the literal phrases contained in the JOCL among respondents. As Dr. Cleff has pointed out, the JOCL is intended to measure more than just the "mechanical" or "procedural" behaviors required and not-wanted for employees on a given job. Thus, the diversity in profiles is compounded by more than just the "types" of jobs profiled.

5.3 CLIENT AND JOB INDICES AND ANALYSIS

This section presents the following data and analyses:

1) Statistical measures and frequency distributions of the client and the job indices.

2) Correlation analyses between client and job indices.

3) Correlation analyses between JOCL book and card sort scores.

4) Correlation analyses between the JOCL combined scores (book plus cards) and job DOT code Data, People, Things, digits.

In the experimental data base, there were 110 clients who took both SICL booklets. The remaining 32 clients only took the Likes and Dislikes (Preference) SICL. Therefore, certain of the analyses to be presented will deal only with the 110 clients who took both booklets while others will deal with the total experimental group of 142 clients.

5.3.1 Statistical Measures and Frequency Distributions of the Client and Job Indices

The purpose of this analysis was to examine the distributional nature of the variable parameters employed in the study. Of primary concern here was to determine how nearly each conformed to the "normal" distribution and, in the cases of serious deviations from normality, to attempt to find suitable transformations that would achieve at least approximate normality for each parameter.

In advance, it was felt that the Client Adjustment and Job Match Indices might be seriously non-normal. Since each is essentially a "correlation coefficient," Fisher's "Z" normalizing transformation as was employed to see if it might provide a more closely normal approximation for these indices. This transformation is as follows:

$$Z(\mathrm{JMI}) = 0.5 \ln \frac{1 + \mathrm{JMI}}{1 - \mathrm{JMI}}$$

or

$$Z(\mathrm{CAI}) = 0.5 \ln \frac{1 + \mathrm{CAI}}{1 - \mathrm{CAI}}$$

where:

JMI = Job Match Index

CAI = Client Adjustment Index

$Z(X)$ = Normal Deviate (Standardized)

Also, since the "difference" indices are basically "sums of squares," they will be distributed as per the Chi-Square distribution. A "normalizing" transformation for this distribution is provided by the following:

$$Z(JDI) = \sqrt{2(JDI)} - \sqrt{2f - 1}$$

$$Z(CDI) = \sqrt{2(CDI)} - \sqrt{2f - 1}$$

where

JDI = Job Difference Index
CDI = Client Difference Index
f = Degrees of freedom for the index
(the number of independent categories upon which index is based = 16 for the Cleff system)

Thus, the transformed difference indices become:

$$Z(JDI) = \sqrt{2(JDI)} - \sqrt{31}$$

$$Z(CDI) = \sqrt{2(CDI)} - \sqrt{31}$$

Table 5-9 presents the pertinent condescriptive statistics for each of the variables of interest, both with and without the employment of the above transformations.

It is seen that in all cases except the case of the JDI for the 32 clients who only completed the Preference SICL, the use of the normalizing transformation did result in a significant reduction in distribution skewness towards the "ideal" normal distribution value of zero.

Figures 5-1 and 5-2 show the frequency histograms of the Client Adjustment and Job Match Indices. The Client Adjustment histogram is based on the 110 observations. The total Job Match Index histogram is based on all 142 cases. In addition, the histogram for the 110 clients who took both booklets is shown within Figure 5-2 as the diagonal slashed portion of the total histogram. Table 5-10

TABLE 5-9

CONDESCRIPTIVE STATISTICS FOR CLIENT AND JOB MATCH INDICES

Parameter	No. of Observations	Observed Range				
		Min.	Max.	Mean	Standard Deviation	Skewness
Not Transformed						
JMI	142	-.64	.83	.291	.291	-.578
JDI	142	805	4919	2158	895	.876
CAI	110	-.55	.95	.371	.374	-.633
CDI	110	116	4000	1273	754	1.118
JMI	110	-.42	.83	.292	.26	-.489
JDI	110	805	4919	2075	848	1.168
JMI	32	-.64	.770	.288	.374	-.627
JDI	32	872	4358	2441	1004	.100
Transformed						
Ƶ(JMI)	142	-.758	1.188	.330	.344	-.178
Ƶ(JDI)	142	34.56	03.62	58.77	13.32	.340
Ƶ(CAI)	110	-.618	1.832	.472	.501	.108
Ƶ(CDI)	110	9.66	83.88	42.78	14.55	.356
Ƶ(JMI)	110	-.448	1.188	.327	.311	-.007
Ƶ(JDI)	110	34.56	93.62	57.62	12.65	.509
Ƶ(JMI)	32	-.758	1.020	.340	.446	-.405
Ƶ(JDI)	32	36.19	87.79	62.73	14.97	-.231

Figure 5-1. Frequency Histogram of the Client Adjustment Index
- 110 Observations
- Class Interval Defined as Lower Limit < CAI ≤ Upper Limit

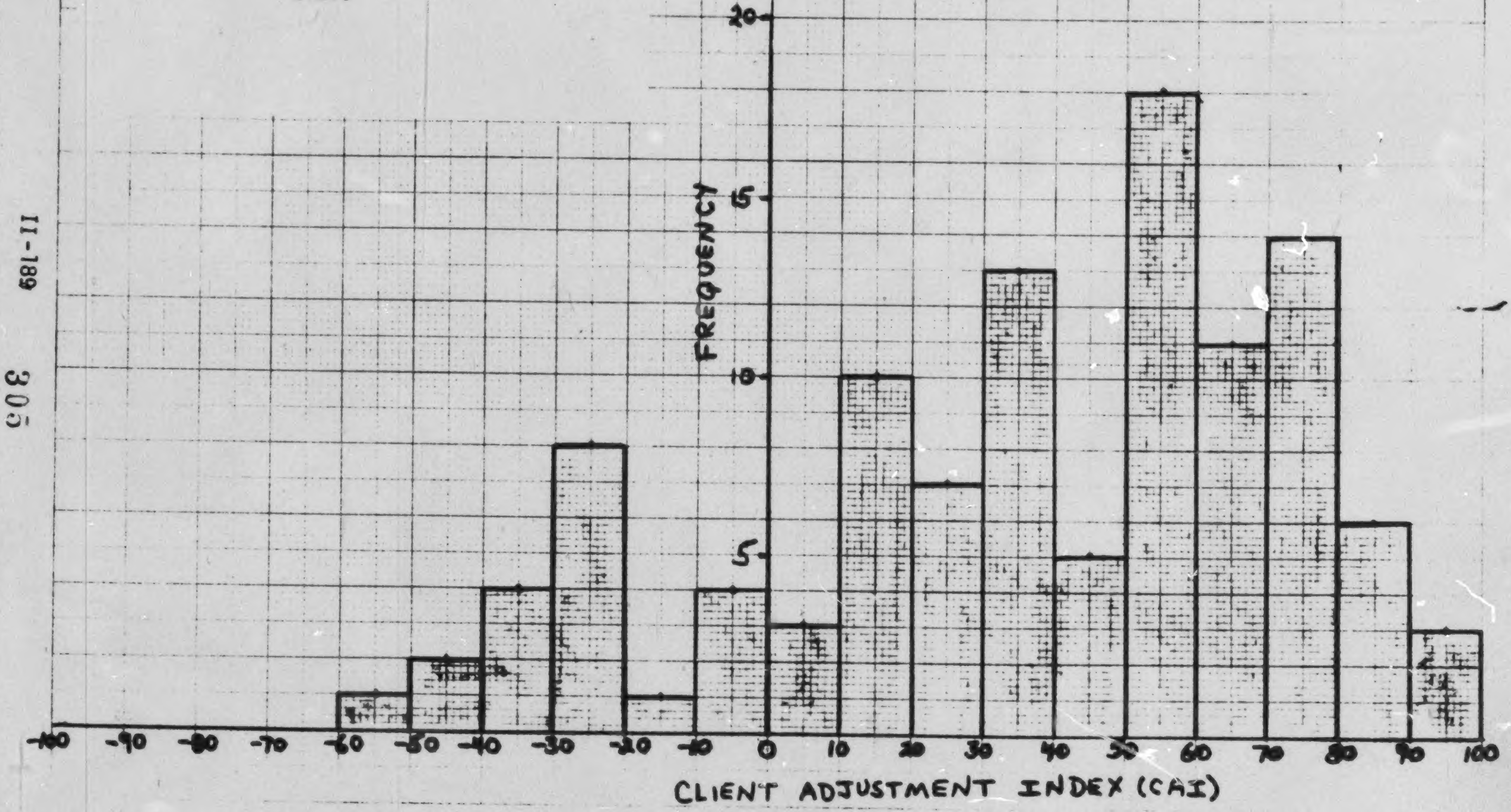


Figure 5-2. Frequency Histogram of the Job Match Index
- 142 Observations
- Class Interval Defined as Lower Limit < JMI ≤ Upper Limit
- Diagonal Slashed Area Is for Clients Who Took Both SICLs, 110 Observations

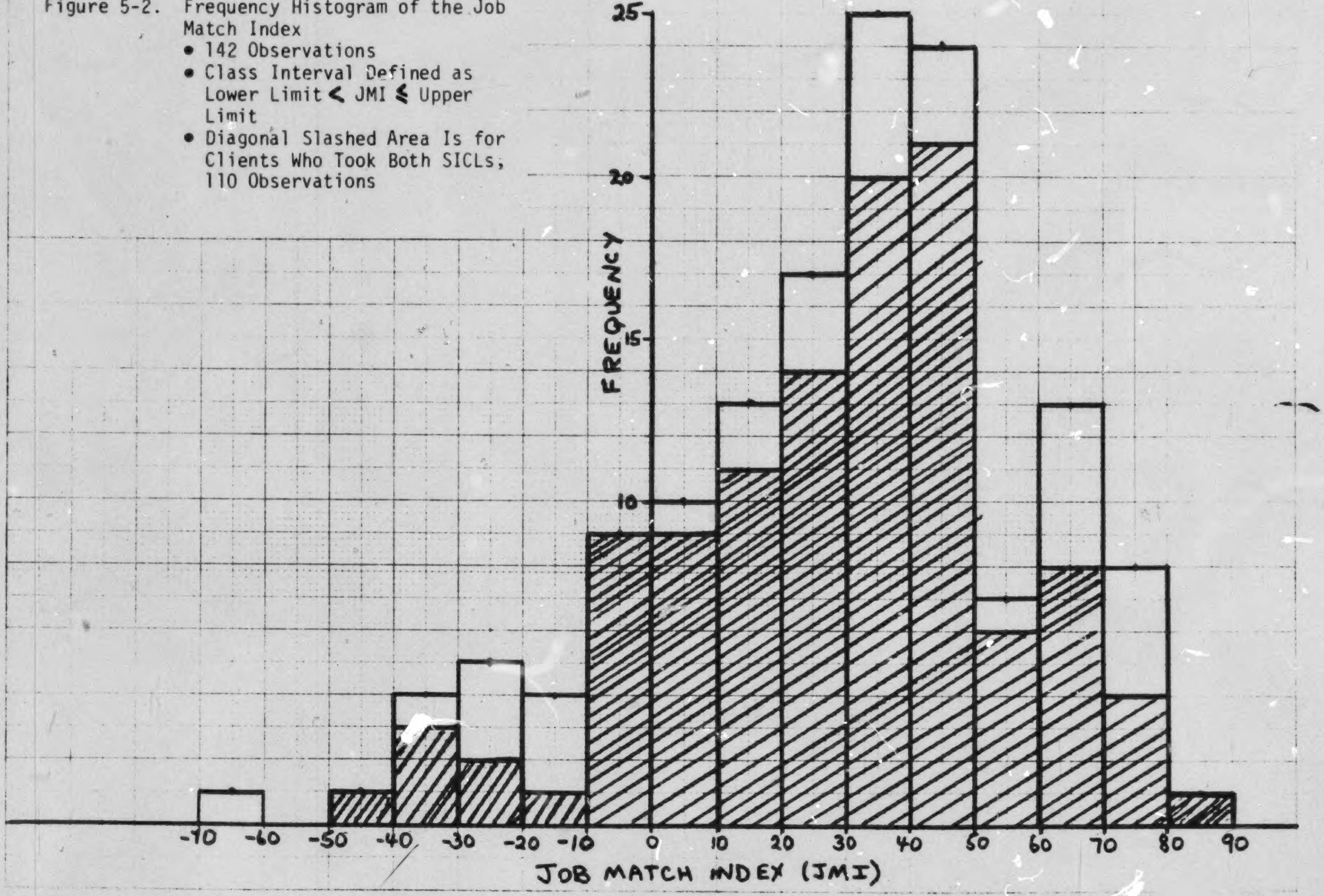


TABLE 5-10

CLIENT ADJUSTMENT AND JOB MATCH INDICES FREQUENCY HISTOGRAM TALLY SHEET

Indice Value		Client Adjustment Index		Job Match Index		Total	
Greater Than or Equal to	Less Than or Equal to	Frequency	Cum.Freq. (Percent)	Both SICLs Frequency	One SICL Frequency	Frequency	Cum.Freq. (Percent)
91	100	3	(100.0)	0	0	0	
81	90	6	(97.3)	1	0	1	(100.0)
71	80	14	(91.8)	4	4	8	(99.3)
61	70	11	(79.1)	8	5	13	(93.7)
51	60	18	(69.1)	6	1	7	(84.5)
41	50	5	(52.7)	21	3	24	(79.6)
31	40	13	(48.2)	20	5	25	(62.7)
21	30	7	(36.4)	14	3	17	(45.1)
11	20	10	(30.0)	11	2	13	(33.1)
1	10	3	(20.9)	9	1	10	(23.9)
-9	0	4	(18.2)	9	0	9	(16.9)
-19	-10	1	(14.5)	1	3	4	(10.6)
-29	-20	8	(13.6)	2	3	5	(7.7)
-39	-30	4	(6.4)	3	1	4	(4.2)
-49	-40	2	(2.7)	1	0	1	(1.4)
-59	-50	1	(0.9)	0	0	0	(0.7)
-69	-60	0		0	1	1	(0.7)
-79	-70	0		0	0	0	
-89	-80	0		0	0	0	
-100	-90	0		0	0	0	

shows the frequency histogram tally sheet used to generate the histograms. The upper and lower class boundary definitions are shown in this table. The cumulative frequency percentages for the CAI and all the JMIs (one or both SICLs) are also shown. The data shows that 18.2% of the 110 clients who took both SICLs had CAIs less than or equal to zero. For the 142 clients, 16.9% had match indices less than or equal to zero, and 79.6% had match indices less than or equal to +50. (The range of the indices was given in Table 5-9.)

5.3.2 Correlation Analyses Between Client and Job Indices

Correlation analyses were conducted to determine if the index measures were correlated or if they could be regarded as independent measures. Table 5-11 summarizes the results of these correlations. The results show that the Job Match and Difference indices and the Client Adjustment and Client Difference indices are significantly inversely correlated. The correlation of the Job Match and Client Adjustment indices supports the conclusion that there is no significant correlation between these two indices. These results are what one would expect given the manner in which these indices are obtained.

The scatter diagram showing the individual client adjustment and job match indice pairs is shown in Figure 5-3. The circled and uncircled points are in toto the 110 cases for which the CAI is available. The circled points represent those cases where the individual was still working at the final retention followup time point, i.e., December 10, 1974. The diagram visually shows what the correlation of these two indices yielded.

The scatter diagram has been divided into 9 areas based on the values of the two indices. This is shown in Figure 5-4. The nine areas or cells have been defined as follows:

Quadrant	Areas (Cells)
I $CAI \geq 0$ $JMI > 0$	1. $0 \leq CAI < +.25$ $0 < JMI < +.50$
	2. $+.25 \leq CAI \leq 1.0$ $0 < JMI < +.50$
	3. $+.25 \leq CAI \leq 1.0$ $+.50 \leq JMI \leq 1.0$

TABLE 5-11

ANALYSIS OF CORRELATION BETWEEN INDEX MEASURES

		Correlation, r		
Description	Number of Observations	Data Transformed	Data Not Transformed	Significance Probability
1. Job Match & Job Difference Indices				
a. All Cases	142	-0.724	-0.721	.001
b. Clients Who Took Both SICLs	110	-0.676	-0.677	.001
c. Clients Who Only Took Preference SICL	32	-0.870	-0.852	.001
2. Client Adjustment and Client Difference Indices				
a. Clients Who Took Both SICLs	110	-0.814	-0.774	.001
3. Client Adjustment and Job Match Indices				
a. Clients Who Took Both Books	110	.047	0.035	Not Significant

Figure 5-3. Scatter Diagram
JMI vs. CAI

- Circled Points Are for Cases Still Working as of December 10, 1974
- Solid Points Are for Cases Terminated Prior to December 10, 1974
- 110 Observations

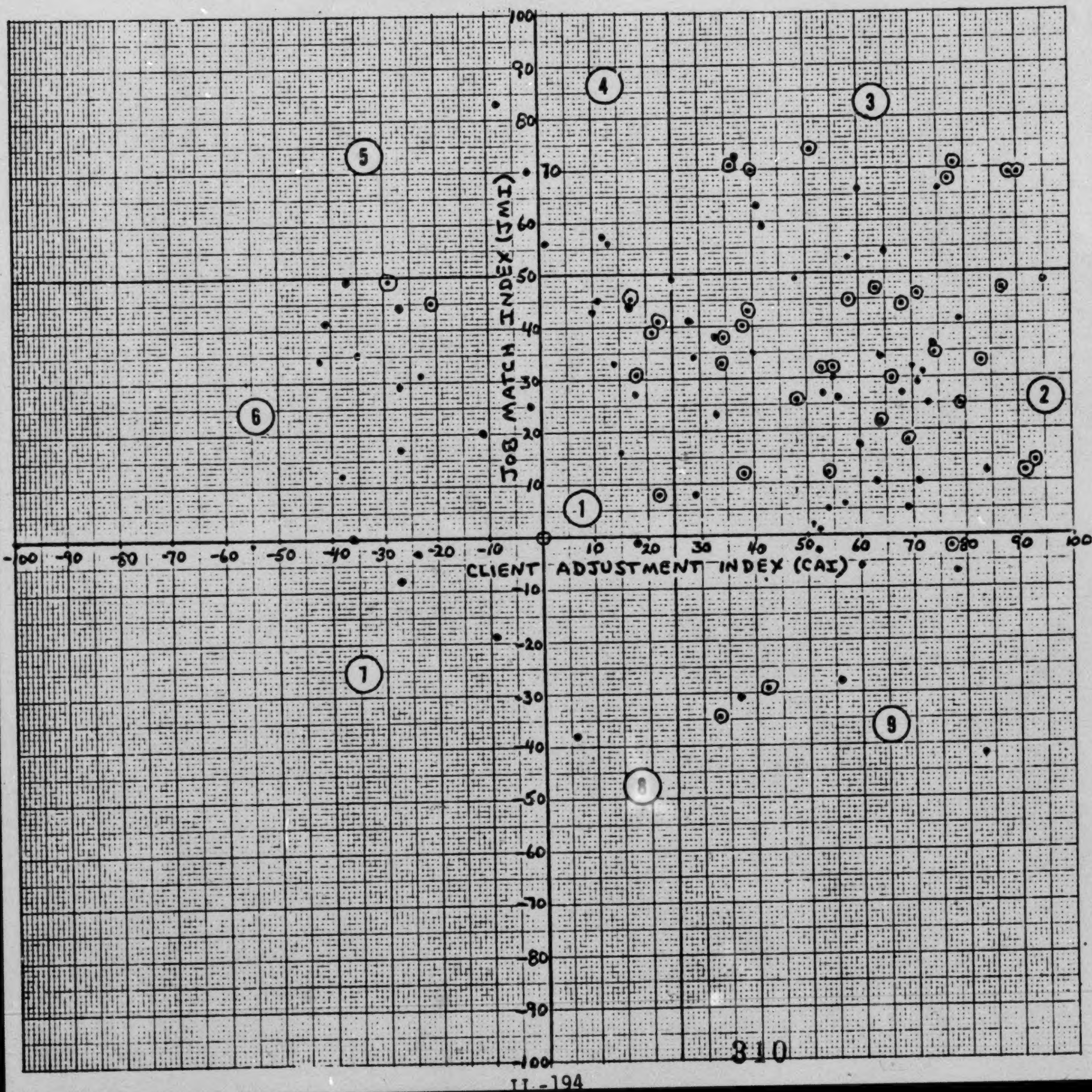
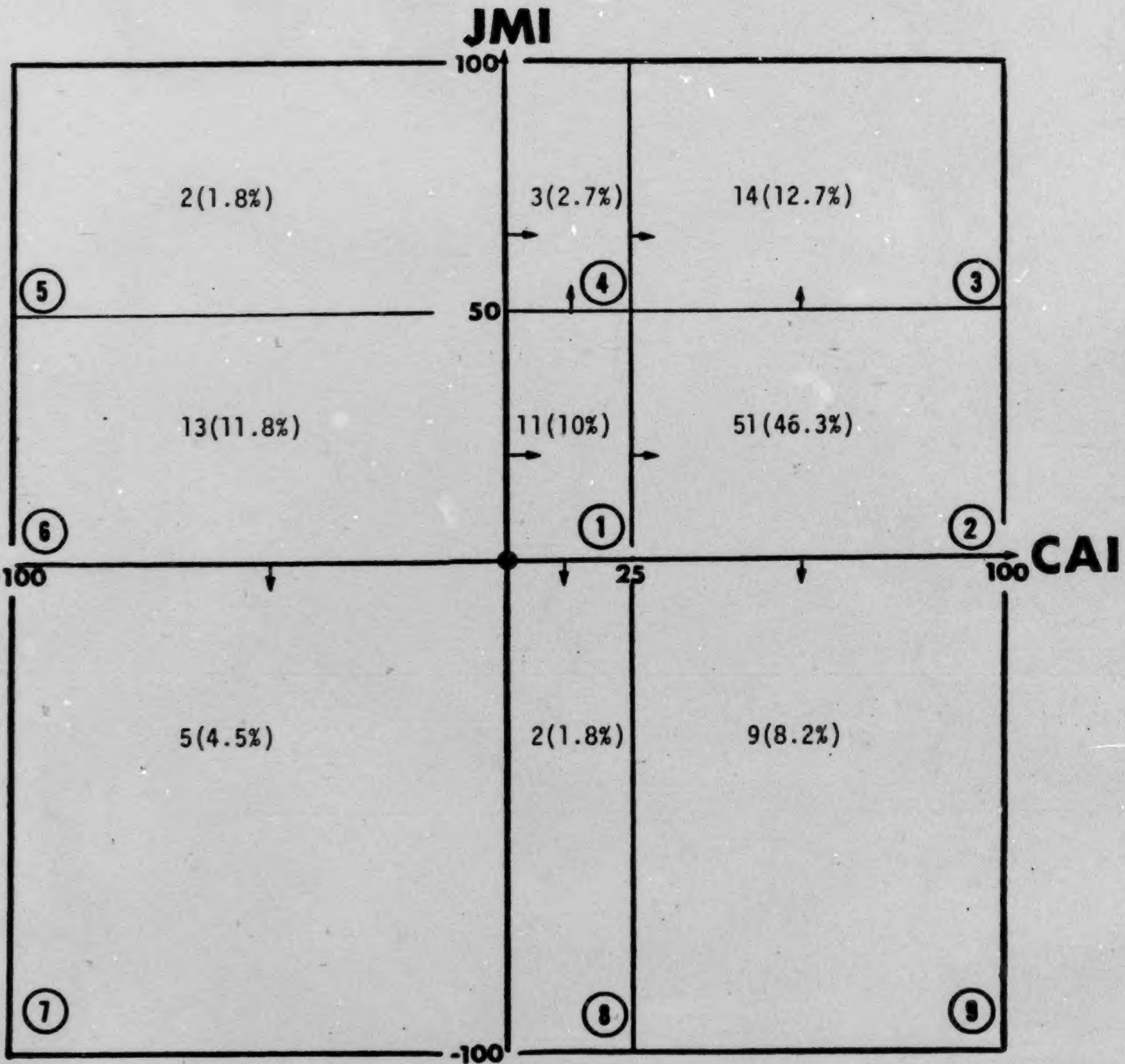


Figure 5-4. Distribution of Paired Observations: Client Adjustment Index (CAI) and

- 110 Observations
- Percentages based on 110 cases



Quadrant	Areas (Cells)
	4. $0 \le CAI < +.25$ $.50 \le JMI \le 1.0$
II $CAI < 0$ $JMI > 0$	5. $CAI < 0$ $+.50 \le JMI \le +1.0$
	6. $CAI < 0$ $0 < JMI < +.50$
III $CAI < 0$ $JMI \le 0$	7. Same as quadrant
IV $CAI \ge 0$ $JMI \le 0$	8. $0 \le CAI \le +.25$ $JMI \le 0$
	9. $+.25 \le CAI \le 1.0$ $JMI \le 0$

As was discussed earlier in this report, there was a cutoff criterion established for the New Jersey experiment which was to govern the referral process. If the client's adjustment index was greater than or equal to +.25 and if the client-job match index was greater than or equal to +.50, then the client was "eligible" for referral and the job was "eligible" for this client to be referred to. The distribution shown in Figure 5-4 indicates that 14 client-job matches out of the total of 110 fell into this range (cell 3 of quadrant 1). This is only 12.7% of the 110 client-job matches where the client took both books. There were a total of 74 clients whose adjustment indice was greater than or equal to +.25 (cells 2,3,9). This is 67.3% of the 110 clients. In addition, there were a total of 19 whose job match index was greater than or equal to +.50 (cells 3,4, and 5). Of the 142 clients, there were a total of 29 whose job match index was greater than or equal to +.50. This is 20.4% of the total 142 clients. Thus, the data clearly shows that the vast majority of client-job matches would not have met either the job match index criterion above or the combined client adjustment and job match criterion. In addition, one sees that almost one-third of the people would not have met the referral "eligibility" criterion based on their client adjustment indice. What this means is that if the criterion that was established for the New Jersey experiment had been applied to the SER experiment than an entirely different set of job placements would have been obtained. Obviously, the attainment of such placements would have depended on the availability to SER of suitable job openings.

Because we do not know if we have a representative sample of SER clients and/or placements, it is not possible to reach any conclusions regarding the client-job matching processes utilized by SER as viewed from the criteria of the Cleff system.

5.3.3 Correlation Analyses Between JOCL Book and Card Sort Scores

The purpose of this analysis was to determine the extent of the correlation between the Job Outline Checklist (JOCL) book dimension scores as compared to the JOCL card sort dimension scores. In the terminology used by Dr. Cleff, these dimension scores are referred to as the "job specific" and the "job general" scores respectively. A separate correlation analysis was done for each of the 16 dimensions. Table 5-12 presents the results of these correlations. As can be seen, there is a reasonably strong positive correlation for every dimension. The correlation coefficients range from +.334 for T8 to +.770 for T1. For each dimension, the observed correlation is significant in excess of the 99% confidence limit. The paper written by Dr. Cleff documenting the development of the system provides similar data (see Appendix B). In that report, the correlation between the book and card dimension scores was given in terms of an average correlation coefficient of +.67. The average correlation coefficient for the JOCLs obtained as part of this evaluation is +.50. Assuming that the referenced report meant that the average correlation was in fact the mean of the individual dimension correlations, then our JOCL book-card correlations were lower than that obtained by Dr. Cleff. The referenced report indicates that the conditions were obtained using twenty-three jobs. The correlations shown in Table 5-12 were obtained using 118 JOCLs.[1]

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[1] Whereas the introduction to this section stated that the analyses to be presented would involve the 110 JOCLs that correspond to the 142 clients whose retention was obtained, we did complete 118 JOCLs. Eight of these were not used in the retention analysis because of problems with the client and/or retention data. These 8 JOCLs were for the following types of jobs:

JOCL#	DOT Code	Employer Job Title
1015	209.388	General Office
1020	382.884	Cleanup Man
1022	237.368	Receptionist
2013	209.388	Clerk Typist
2016	237.368	Receptionist
2020	237.368	Receptionist
2017	166.268	Assistant Placement Interviewer
4021	726.781	Assembler

TABLE 5-12

CORRELATION BETWEEN JOCL BOOK AND CARD DIMENSION SCORE

Component	
T_1	0.770
T_2	0.335
T_3	0.758
T_4	0.504
T_5	0.523
T_6	0.487
T_7	0.569
T_8	0.334
P_1	0.432
P_2	0.428
P_3	0.383
P_4	0.504
I_1	0.353
I_2	0.555
I_3	0.707
I_4	0.386

It should again be noted that the manner in which Ultrasystems instructed the respondent to sort the JOCL cards is different than that specified by the instructions as stated in the JOCL itself. This was discussed earlier in this report (see Section 4).

5.3.4 Correlation Analyses Between JOCL Combined Scores and the Job DOT Code Data, People, Things, Digits

The purpose of this analysis was to determine if there is a relationship between the JOCL dimension scores and the Data, People, Things digits of the DOT codes assigned to the jobs that were profiled. The 6-digit DOT code was assigned by Ultrasystems based on the job description obtained as part of the administration of the JOCL. These assigned DOT codes were shown in Table 5-6.

This analysis was conducted using the total of 118 JOCLs obtained (see the discussion in Section 5.3.3).

An initial set of correlation analyses was performed within the DOT Data, People, Things digits for the 118 jobs. The results are shown in block ① of Table 5-13. All the correlation coefficients were found to be significant at the 99% confidence level.

Thus, the "Data" and "People" digits are seen to be positively correlated over the set of jobs used, while the "Things" digit was inversely correlated with both the "Data" and "People" digits. However, since this analysis was done with only the 118 jobs that were profiled, there is no way of knowing to what degree these results would hold across all the DOT codes.

Correlation analyses were then conducted between the DOT Data, People, Things digits and the total sum of the JOCL dimension scores in the three dimension categories Things, People, and Ideas. The results are shown in block ② of Table 5-14. What has been done here is to calculate for each JOCL the sum of the 8 dimension scores relating to Things, the 4 dimension scores relating to People, and the 4 dimension scores relating to Ideas. All three of these correlations were found to be statistically significant at the 99.9% confidence level.

Thus, in each case, the DOT digits are seen to be inversely correlated to the Cleff rating for the corresponding job characteristic skill level. This would be the expected result, since the DOT rating is lowest for an "increased" skill level requirement, while the opposite is true of the Cleff rating scales.

TABLE 5-13

CORRELATIONS BETWEEN DOT CODE DATA, PEOPLE, THINGS AND THE CJMS JOCL DIMENSION SCORES

① DOT Digits Correlated	r
DATA (4th digit) vs. PEOPLE (5th digit)	0.414
DATA (4th digit) vs. THINGS (6th digit)	-0.361
PEOPLE (5th digit) vs. THINGS (6th digit)	-0.247

② DOT Digit vs. JOCL Total Score	r
DATA (4th digit) IDEAS (set of 4)	-0.436
PEOPLE (5th digit) PEOPLE (set of 4)	-0.620
THINGS (6th digit) THINGS (set of 8)	-0.365

③ DOT Digit vs. JOCL Component		r
DATA (4th digit)	I_1	-0.178
"	I_2	-0.138
"	I_3	-0.562*
"	I_4	-0.228
PEOPLE (5th digit)	P_1	-0.532*
"	P_2	-0.139
"	P_3	-0.407*
"	P_4	-0.430*

The above analyses were also performed by individual JOCL dimension for the Ideas and People characteristics in order to determine which components were most correlated with the corresponding DOT digit rating. The results are shown in block ③ of Table 5-13.

The correlation estimates followed by * are the only ones found to be statistically significant at the 99% confidence level. Thus, the DOT Data digit appears to be correlated only to JOCL component I_3, at least in a major way, while three of the four JOCL People components were found to be significantly correlated to the DOT People digit.

As mentioned previously, however, a wider range of job profile data sets would have to be analyzed in order to verify and generalize these results.

5.4 RETENTION DATA AND ANALYSES

Before presenting the retention data obtained and the analyses performed, the following points are presented as a brief review of the key aspects of this part of the analysis:

1) The retention of the 142 people included in our sample was obtained by telephone contact with the respective employers. These telephone contacts were done at four time points, i.e., December 31, 1973, February 28, 1974, May 31, 1974, and December 10, 1974.

2) The employer was asked if the person was still working and if the response was No then the date terminated and the reason for the termination was obtained. No questions were asked regarding job or salary changes.

3) The sample of 142 people consisted of one group of 110 people who completed both SICL booklets and 32 people who only completed the preferences (Likes and Dislikes) SICL.

4) At the final retention followup date (December 10, 1974), 48 of the 142 people (33.8%) were still employed with their original employer. The 142 people were hired into their respective jobs over a seven-month time period, i.e., from early March 1973 to early October 1973. Thus, the maximum and minimum retention periods could be from approximately 21 months to 14 months, respectively.

5) No information was obtained from the people themselves nor was any other data regarding their job performance other than their retention, obtained.

The subsections to follow will present the following data and analyses:

Subsection	Data and Analyses Presented
5.4.1	Hire, termination, and days worked data distributions for the sample.
5.4.2	Statistical analyses of the differences between client and job match indices for client groups obtained by grouping those clients who worked less than or equal to "X" days and those who worked longer than "X" days. The analyses were done for 5 values of "X"; e.g., 30, 60, 90, 120, and 199 days. In addition, the same analyses were done between those clients who terminated prior to December 10, 1974 and those who were still working as of this date. These analyses are referred to as the Truncation of Time Worked Analyses.
5.4.3	Statistical analysis of the relationship between the job match index and the subsequent retention done from the standpoint of a life testing problem. This analysis, referred to as the "exponential analysis," uses a mean-time-between-failure variable obtained by summing all the days worked by a group of people (whose job match index lies in a certain range) and dividing this sum by the number of these people who terminated prior to December 10, 1974.
5.4.4	Multiple regression analyses using days worked as the dependent variable and the client adjustment and job match indices as the independent variables. Two analyses were done, one of which involved the 71 people who took both SICLs and who terminated prior to December 10, 1974. The other one utilized all 110 cases where both SICLs were taken and assigned a random future termination time to the 39 people of this group who were still working as of December 10, 1974. In addition, the effect of the restriction on known days-worked-till-termination was estimated using a statistical methodology.
5.4.5	Termination reason data and distributions for the sample of 94 people who terminated prior to December 10, 1974.

5.4.1 Hire, Termination, and Days Worked Data Distributions

Figure 5-5 shows the frequency histogram of the date of hire for the 142 people in our sample. The frequency histogram uses a two calendar week class interval. The earliest hires occurred in the two-week period March 3 through March 14, 1973, and the last hires occurred in the two-week period September 22, through October 6, 1973. Of the total 142 hire dates, 75 or 52.8% occurred on or before June 9, 1973. The diagonally slashed portion of the histogram shows the hire date distribution for the 110 clients who took both SICLs.

Figure 5-6 shows the frequency histogram of the calendar days worked till termination for the 94 people who terminated prior to December 10, 1974. The class interval is 30 calendar days. The diagonally slashed area of the histogram shows the distribution for the 71 people who terminated prior to December 10, 1974 and who took both SICLs. The days-worked-till-termination histogram shows in a general sense an exponential distribution. Included in Figure 5-6 is the frequency histogram for the calendar days worked for the 48 people who were still working as of the last retention followup time of December 10, 1974. Again, the diagonally slashed area shows the distribution for those people who took both SICLs. If one visually moves the days worked distribution for those 48 people who were still working at the time of the last followup down to the bottom basicca, one sees that the known distribution of days worked is, broadly speaking, U-shaped.

Figure 5-7 shows the cumulative frequency and percentage cumulative frequency distributions for the 94 people who terminated prior to December 10, 1974. The solid ogive shows the cumulative frequency and the dashed ogive the cumulative percentage frequency. One sees that 50% of the total terminations worked less than or equal to 90 days. Thus, of the total 142 people whose retention was tracked, 48 or 33.8% worked less than or equal to 90 calendar days. Again, of the total of 142 people, the figure shows that 71 or 50% worked less than or equal to 180 calendar days.

Table 5-14 shows the frequency histogram tallies used to generate the figures.

Figure 5-5. Frequency Histogram of the Date Hired

- 142 Observations
- Diagonal Slashed Area Is for the 110 Clients Who Took Both SICLs

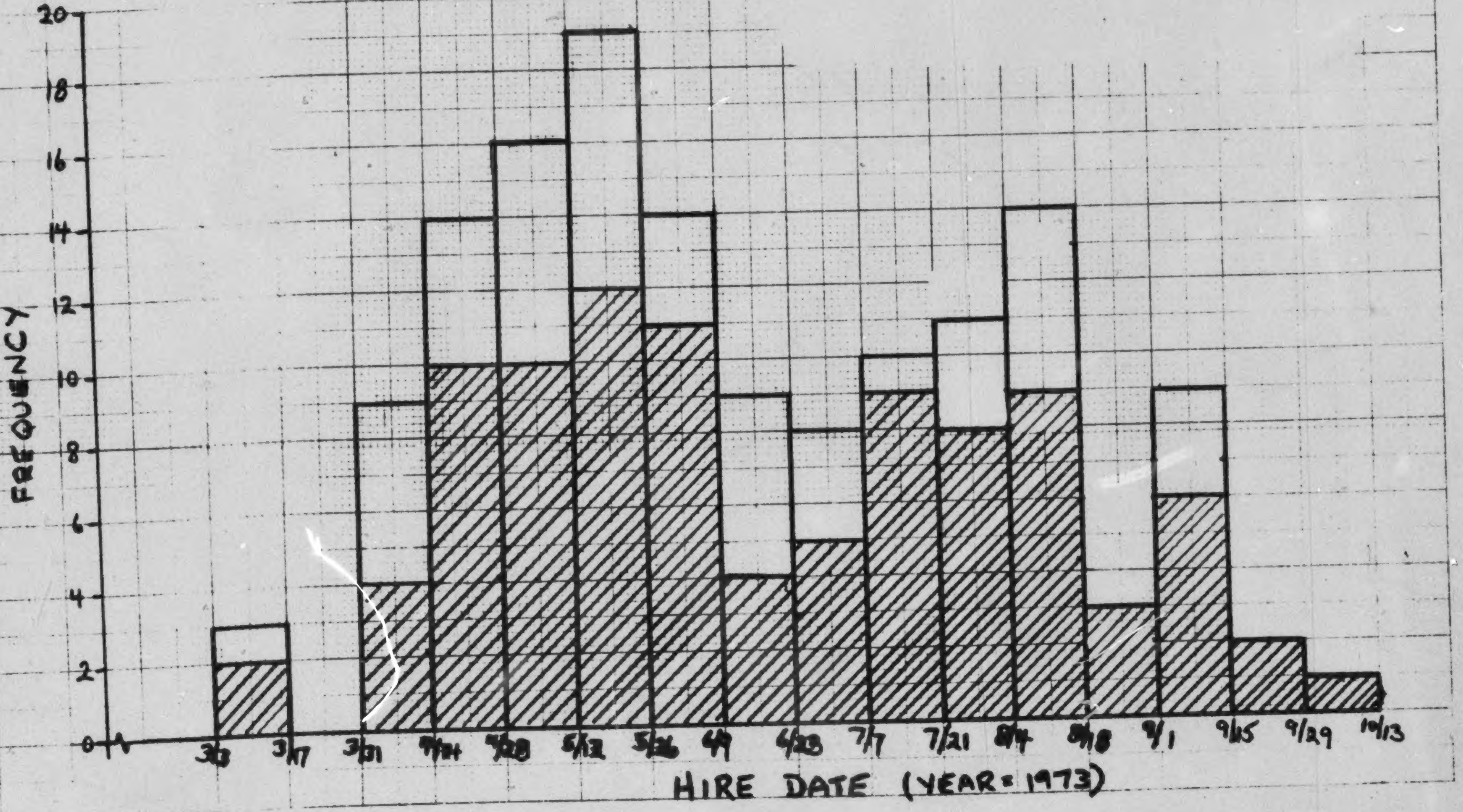


Figure 5-6. Frequency Histograms:
- Calendar Days Employed Till Termination (94 observations)
- Calendar Days Employed for Clients Still Working as of 12/10/74 (48 observations)

Note: Diagonal Slashed Area Is for Clients Who Took Both SICLs.

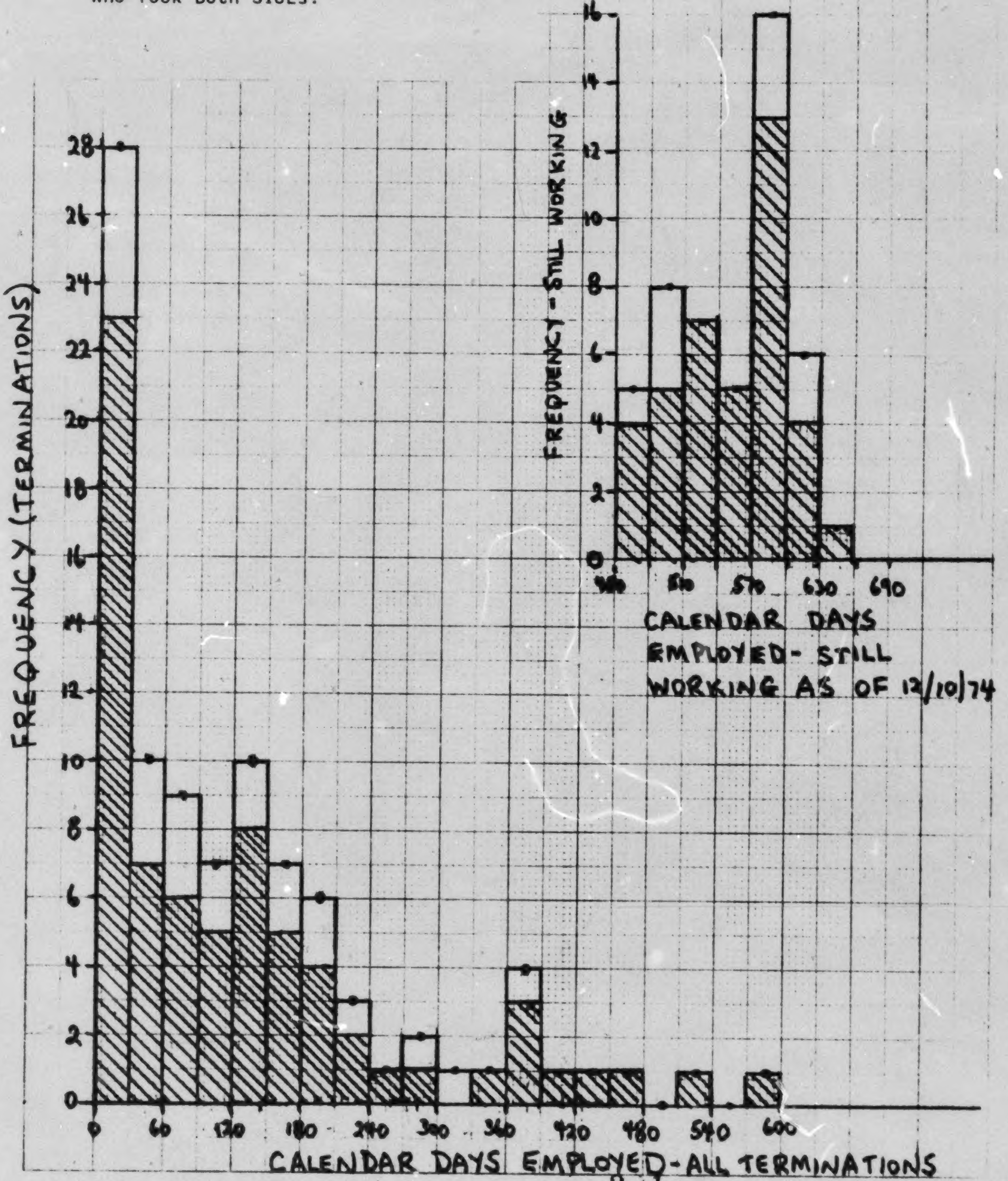


Figure 5-7. Cumulative Frequency and Percentage Cumulative Frequency of Calendar Days Employed Till Termination (94 observations)

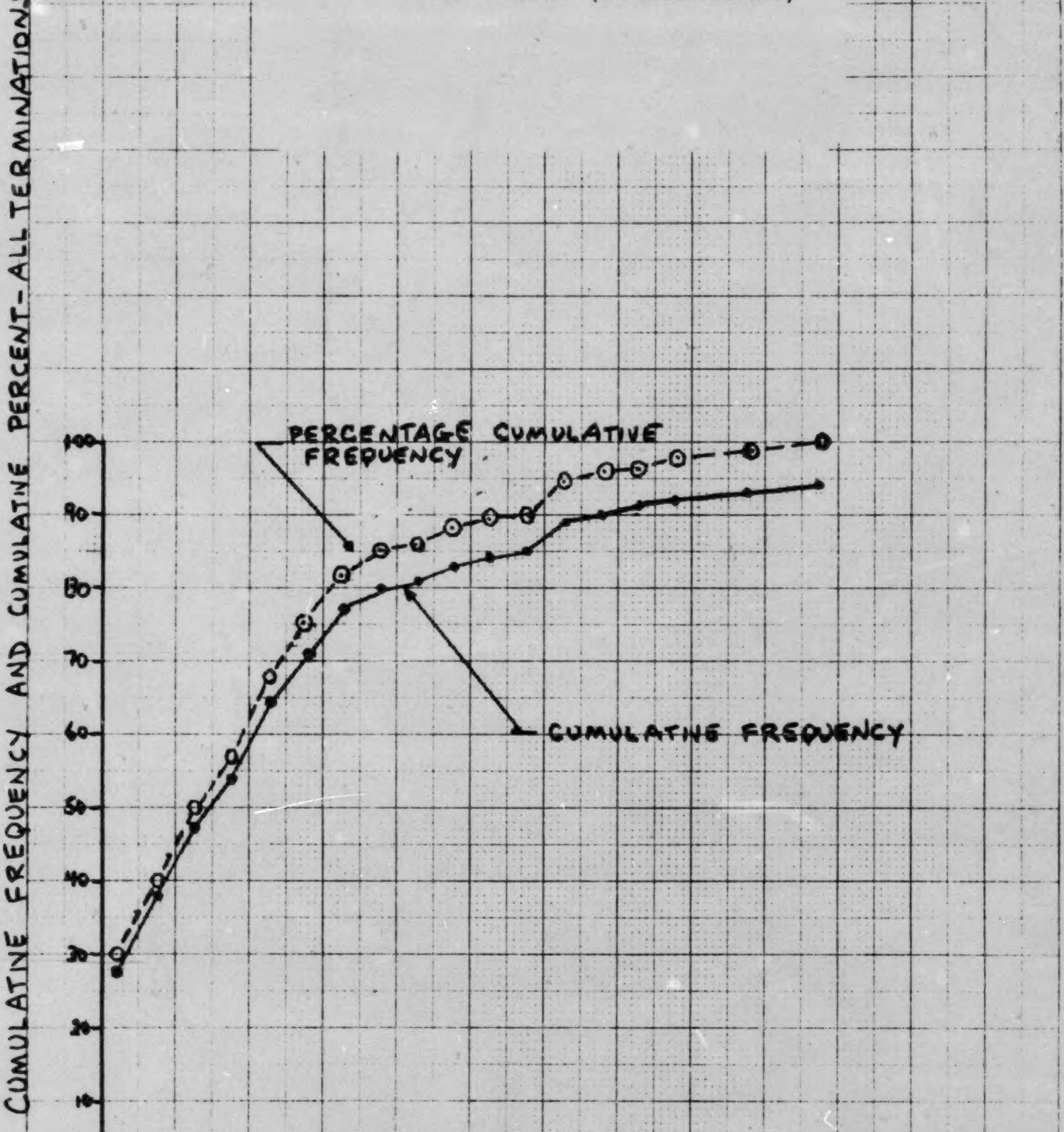


TABLE 5-14

FREQUENCY HISTOGRAM TALLIES FOR DAYS WORKED

Number of Days For Those People Who Terminated Prior to December 10, 1974		Client Took Both SICLs	Client Took 1 SICL (Pref)	Total	Cum. Total	Cum. Percent
0	30	23	5	28	28	29.8
31	60	7	3	10	38	40.4
61	90	6	3	9	47	50.0
91	120	5	2	7	54	57.4
121	150	8	2	10	64	68.1
151	180	5	2	7	71	75.5
181	210	4	2	6	77	81.9
211	240	2	1	3	80	85.1
241	270	1	0	1	81	86.2
271	300	1	1	2	83	88.3
301	330	0	1	1	84	89.4
331	360	1	0	1	85	90.4
361	390	3	1	4	89	94.7
391	420	1	0	1	90	95.7
421	450	1	0	1	91	96.8
451	480	1	0	1	92	97.9
481	510	0	0	0	92	97.9
511	540	1	0	1	93	98.9
541	570	0	0	0	93	98.9
571	600	1	0	1	94	100.0
	Total	71	23	94		

Days Worked for Those People Still Working as of December 10, 1974						
451	480	4	1	5	5	10.4
481	510	5	3	8	13	27.1
511	540	7	0	7	20	41.7
541	570	5	0	5	25	52.1
571	600	13	3	16	41	85.4
601	630	4	2	6	47	97.9
631	660	1	0	1	48	100.0
	Totals	39	9	48		

Number of Days For Those People Who Terminated Prior to December 10, 1974	All Terminations		Terminations Who Took Both SICLs	
	Number of Terminations	Cumulative	Number	Cumulative
0 - 30	28	28	23	23
31 - 60	10	38	7	30
61 - 90	9	47	6	36
81 - 120	7	54	5	41
121 - 199	20	74	14	55
200 - 299	9	83	7	62
300 - 399	6	89	4	66
400 - 499	3	92	3	69
500 - 599	2	94	2	71

5.4.2 Analysis of Cleff Client and Job Match Indices and Fixed Truncation Levels of Job Retention Time

The purpose of this analysis was to determine if there were certain levels of the client and job match indices which served to differentiate between significant shifts in job retention times.

The job retention times selected to be investigated for this analysis were as follows:

Worked less than or equal to, compared to, worked more than

A) 30 days
B) 60 days
C) 90 days
D) 120 days
E) 199 days

Tables 5-15 and 5-16 present the pertinent data that were used for each of the above analyses. Table 5-15 shows the data and analyses done using the actual values of the indices. Table 5-16 shows the corresponding data using the transformed indices. The entire sample of 142 was used for the JMI and JDI analyses. The corresponding sample for the CAI and CDI analyses was limited to the 110 clients who completed both booklets. The student "t" test was applied to the worked-less-than-or-equal-to and worked-more-than index averages resulting from the two sets of cases obtained from each truncation level.

The data shown in the table indicate that there is a statistically significant relationship between the job match index and the probability that the person will remain employed over the initial 120 calendar days from the date of hire.

The optimum level of truncation for the JMI appears to occur at about 60 days. As can be seen in the two tables, the value of "t" for the t-test for the JMI is maximum at this level. Also, it is the only level at which all 4 indices are judged simultaneously to be significantly different in both tables, i.e., transformed indices and actual indices.

The CAI and CDI indices appear to pass through an initial optimum also at 60 days; however, there is also a long-term effect which becomes even more significant at 199 days and is maximal at the time of the last employment status check. This is more clearly seen by the t-tests, which compare all "terminated" versus all "still working" as of December 10, 1974, as shown in Table 5-17.

TABLE 5-15 ANALYSIS OF CLEFF SYSTEM SCORES VERSUS LENGTH OF TIME WORKED: TIME WORKED CATEGORIZED IN DISCRETE INCREMENTS (I.E., FIXED TRUNCATION POINTS)

Note: (1) The data shown for the CAI and CDI is for 110 clients.

(2) The data shown for the JMI and JDI is for 142 clients.

(3) Indices are actual values

	Job Retention Times (In Days)		CAI	CDI	JMI	JDI
(A)	0-30	$\bar{x}$	26.4	1512.4	14.2	2274.0
		s	36.6	833.9	31.6	949.6
		n	23	23	28	28
	> 30	$\bar{x}$	39.9	1210.7	32.8	2129.2
		s	35.9	721.2	26.9	870.6
		n	87	87	114	114
		t	1.60	-1.73	3.16	-0.77
		*Sig.	-	+	+++	-
(B)	0-60	$\bar{x}$	25.3	1488.2	13.7	2396.6
		s	38.5	798.0	32.0	1071.2
		n	30	30	38	38
	> 60	$\bar{x}$	41.5	1193.3	34.8	2070.5
		s	35.1	726.5	26.3	810.9
		n	80	80	104	104
		t	2.10	-1.85	3.99	-1.94
		Sig.	+	+	+++	+
(C)	0-90	$\bar{x}$	33.4	1356.9	17.3	2364.3
		s	35.7	744.9	31.2	1038.6
		n	36	36	47	47
	> 90	$\bar{x}$	38.9	1233.3	35.0	2055.5
		s	36.1	746.8	26.2	805.0
		n	74	74	95	95
		t	0.75	-0.82	3.55	-1.95
		Sig.	-	-	+++	+
(D)	0-120	$\bar{x}$	31.1	1340.5	19.7	2296.5
		s	38.2	758.8	30.5	1008.0
		n	41	41	54	54
	>120	$\bar{x}$	40.7	1234.1	34.9	2072.6
		s	34.8	739.3	26.3	808.9
		n	69	69	88	88
		t	1.35	-0.72	3.14	-1.46
		Sig.	-	-	++	-
(E)	0-199	$\bar{x}$	27.1	1447.6	25.6	2154.4
		s	37.1	794.0	29.2	928.4
		n	55	55	74	74
	> 199	$\bar{x}$	47.2	1100.0	32.9	2161.4
		s	35.4	704.3	26.8	852.7
		n	55	55	68	68
		t	2.91	-2.43	1.55	0.05
		Sig.	++	++	-	-

Significance Code: - = difference between means not significant
+ = " " " significant at 95% confidence level
++ = " " " " " 99% " "
+++ = " " " " " 99.9% " "

TABLE 5-16. ANALYSIS OF CLEFF SYSTEM SCORES VERSUS LENGTH OF TIME WORKED: TIME WORKED CATEGORIZED IN DISCRETE INCREMENTS (I.E., FIXED TRUNCATION POINTS)

Note: (1) The data shown for the CAI and CDI is for 110 clients.

(2) The data shown for the JMI and JDI is for 142 clients.

(3) Indices are transformed values.

Job Retention Times (In Days)		Z(CAI)	Z(CDI)	Z(JMI)	Z(JDI)
0-30	$\bar{x}$	.303	47.52	.154	60.52
	s	.421	14.70	.351	13.67
	n	23	23	28	28
>30	$\bar{x}$	.517	41.53	.378	58.34
	s	.471	13.51	.317	13.03
	n	87	87	114	114
	t	1.98	-1.86	3.28	-0.79
	sig	+	+	+++	-
0-60	$\bar{x}$	.298	47.17	.148	62.01
	s	.453	14.44	.352	15.24
	n	30	30	38	38
>60	$\bar{x}$	.537	41.14	.402	57.58
	s	.464	13.52	.314	12.33
	n	80	80	104	104
	t	2.42	-2.05	4.13	-1.78
	sig	++	+	+++	+
0-90	$\bar{x}$	.421	44.40	.191	61.62
	s	.448	13.94	.348	14.92
	n	36	36	47	47
>90	$\bar{x}$	.497	42.00	.405	57.36
	s	.467	13.70	.312	12.23
	n	74	74	95	95
	t	0.81	-0.86	3.70	-1.81
	sig	-	-	+++	-
0-120	$\bar{x}$	.398	44.03	.220	60.63
	s	.480	14.35	.347	14.65
	n	41	41	54	54
>120	$\bar{x}$	.516	42.04	.404	57.62
	s	.450	13.44	.310	12.21
	n	69	69	88	88
	t	1.30	-0.73	3.28	-1.32
	sig	-	-	+++	-
0-199	$\bar{x}$	.341	46.10	.292	58.56
	s	.455	14.34	.343	13.72
	n	55	55	74	74
>199	$\bar{x}$	.603	39.47	.380	58.99
	s	.466	13.22	.304	12.55
	n	55	55	68	68
	t	2.98	-2.52	1.61	0.19
	sig	++	++	-	-

Significance Code: - = difference between means not significant
+ = " " " significant at 95% confidence level
++ = " " " " " 99% " "
+++ = " " " " " 99.9% " "

TABLE 5-17. ANALYSIS OF SCORES (INDICES) FOR THOSE PEOPLE STILL WORKING AS OF DECEMBER 10, 1974 AND THOSE WHO TERMINATED PRIOR TO THIS TIME

Status as of 12-10-74		CAI	CDI	JMI	JDI
All Terminated	$\bar{x}$	29.1	1459.3	26.1	2201.5
	s	37.3	786.1	28.9	933.4
	n	71	71	94	94
All Still Working	$\bar{x}$	51.8	936.1	34.9	2072.1
	s	35.3	701.1	27.0	827.2
	n	39	39	48	48
	t	3.11	-3.47	1.75	-0.81
	sig	++	+++	+	-

		Z(CAI)	Z(CDI)	Z(JMI)	Z(JDI)
All Terminated	$\bar{x}$	.363	46.47	.296	59.29
	s	.300	14.62	.356	14.09
	n	71	71	94	94
All Still Working	$\bar{x}$	.670	36.15	.407	57.75
	s	.458	11.62	.295	11.75
	n	39	39	48	48
	t	4.24	-3.80	1.86	-0.65
	sig	+++	+++	+	-

(See Table 5-16 for significance codes.)

All the people who terminated prior to this time had an average CAI of 29.1 compared to an average of 51.8 for those still working. The JMI comparison, although significant, had a much smaller difference (26.1 versus 34.9 for the still-working).

Thus, the data indicates that although both CAI and JMI are related to job retention, it is the CAI which relates to long-term employment potential while the JMI is the important measure of surviving the initial period of employment, particularly during the first three months. In addition, the analyses show that the use of the actual indice values as opposed to the transformed values yields essentially the same results.

Figure 5-8 shows, graphically, the means of the CAI and JMI for the two client groups over the five values of calendar days worked. The figure shows the emerging divergent pattern of the CAI between the worked-greater-than and worked-less-than client groups when the number of days is greater than (or less than or equal to) 90.

Figures 5-9 through 5-13 show a series of scatter diagrams of the client adjustment and job match indice pairs. All these figures show the scatter diagram for the 110 people who took both SICLs. The first diagram (Figure 5-9) differentiates between those clients who terminated prior to December 10, 1974 (the points) and those who were still working at that time (the circled points). The next four figures identify in a cumulative manner the cases who terminated after working less than or equal to 30, 60, 90, and 120 days, respectively. These cases are identified by the cross over the point. Figure 5-14 shows the frequency counts of the number of cases and the number of terminations in the nine cells defined in Section 5.3.2 (note: Figure 5-9 was presented in this section as was part of Figure 5-14). The slashed cells identify those ranges of CAI and JMI values where all the clients which had indice values in this range terminated prior to December 10, 1974.

Figure 5-14 and the scatter diagrams graphically illustrate the relationships shown in Tables 5-15 through 5-17. As an example, the data shown in Figure 5-14 shows that for those 74 clients whose CAI was greater than or equal to +25 (cells 2, 3, and 9), 42 (56.8%) terminated prior to December 10, 1974, whereas for those 36 whose CAI was less than +25 the number who terminated was 29 (80.6%). This way of looking at the relative retention masks the actual length of employment due to the wide range of hire dates shown earlier.

Figure 5-8. Mean VAlues of the CAI and JMI for Groups Employed Less Than or Equal To or Greater Than "X" Days

Note: Number of Observations at Values of "X" Are Shown in Parentheses.

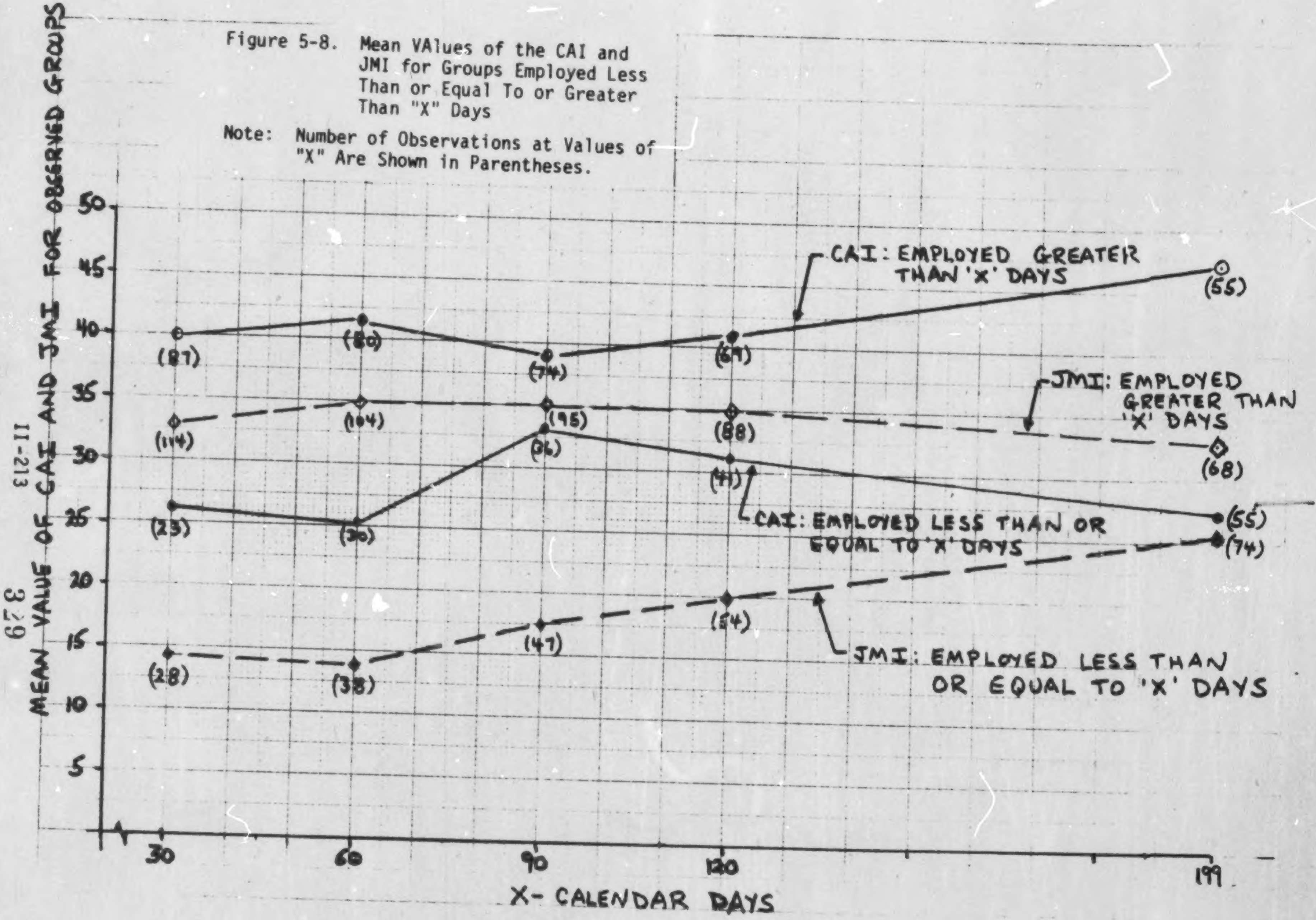


Figure 5-9. Scatter Diagram Job Match Index and Client Adjustment Index
- 110 Observations
- Terminations Are Points (71 observations)
- Still Working as of December 10, 1974 Are Circled Points (39 observations)

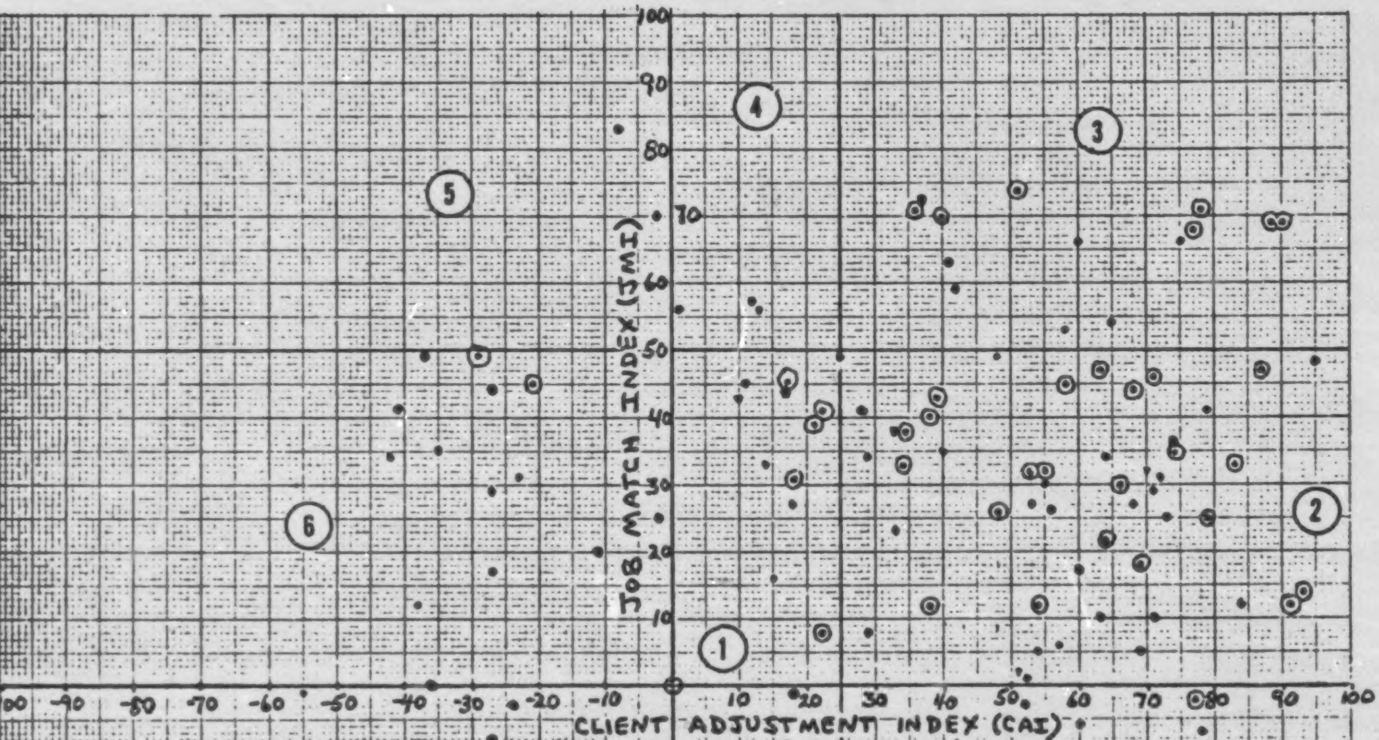


Figure 5-10. Scatter Diagram JMI and CAI

- Terminations Employed Less Than or Equal To 30 Days Marked by X

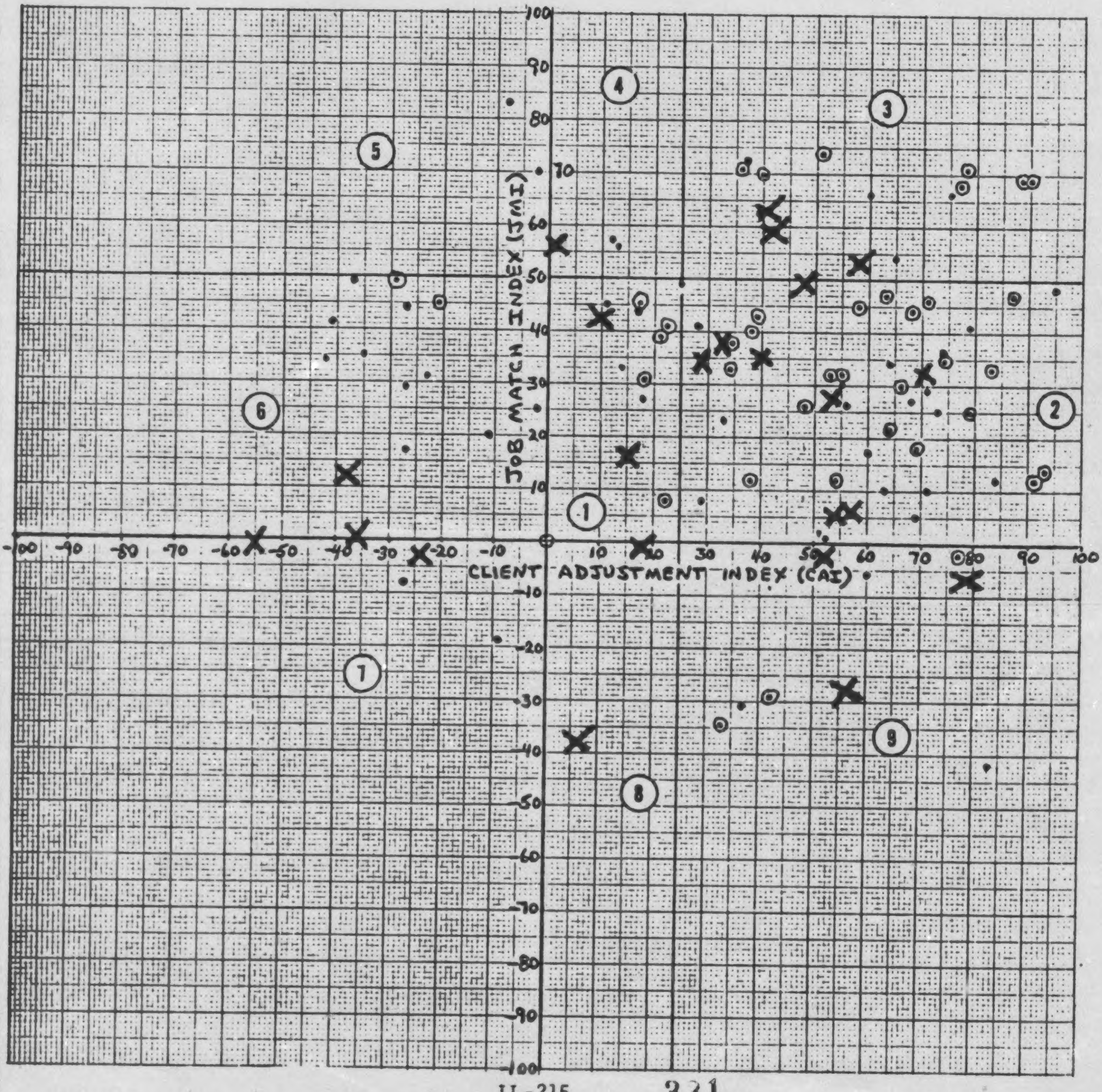


Figure 5-11. Scatter Diagram JMI and CAI
- Terminations Employed Less Than or Equal To 60 Days Are Marked by X

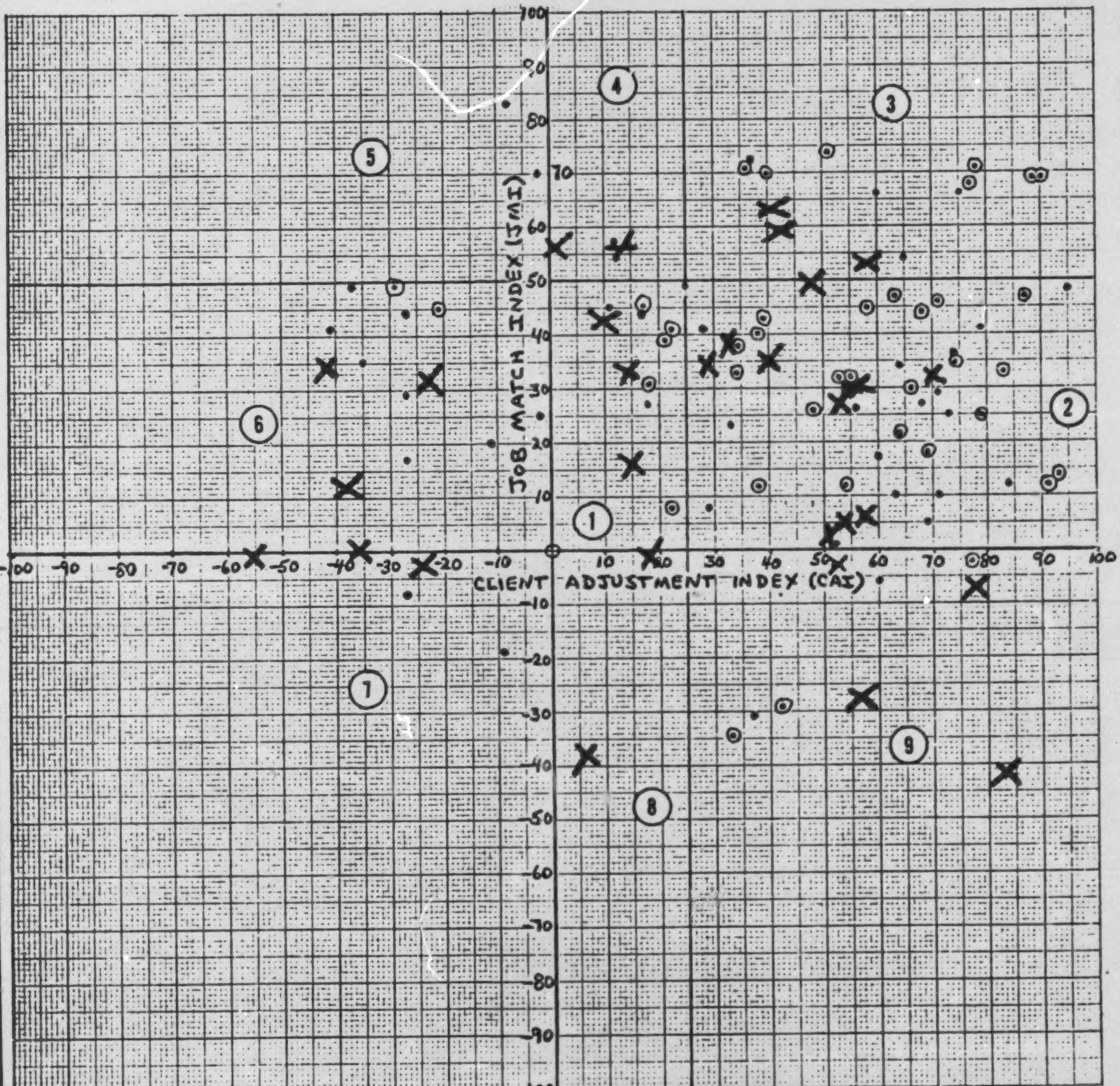


Figure 5-12. Scatter Diagram JMI and CAI

- Terminations Employed Less Than or Equal To 90 Days Are Marked by X

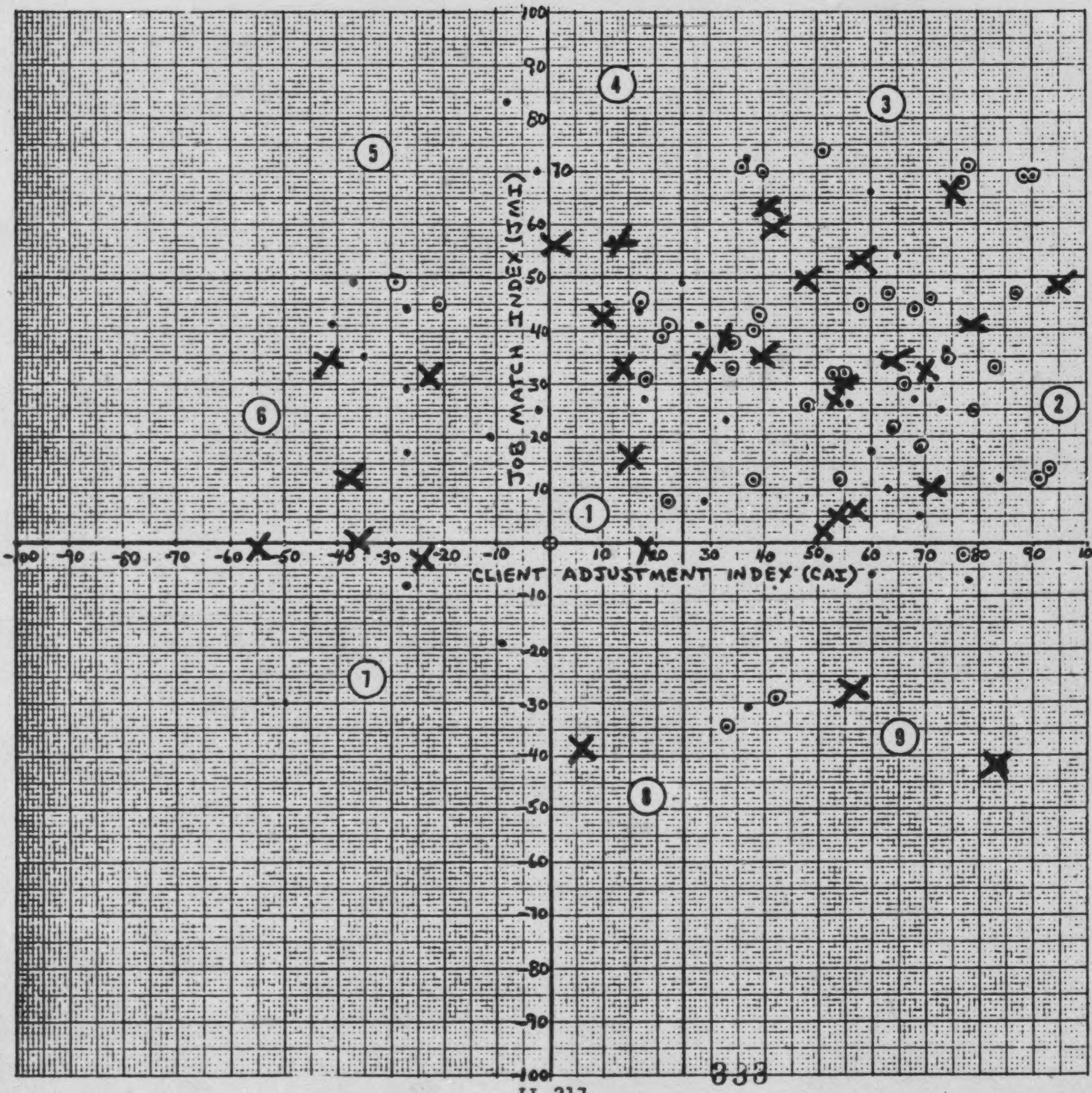


Figure 5-13. JMI and CAI
- Terminations Employed Less Than or Equal To 120 Days Are Marked by X

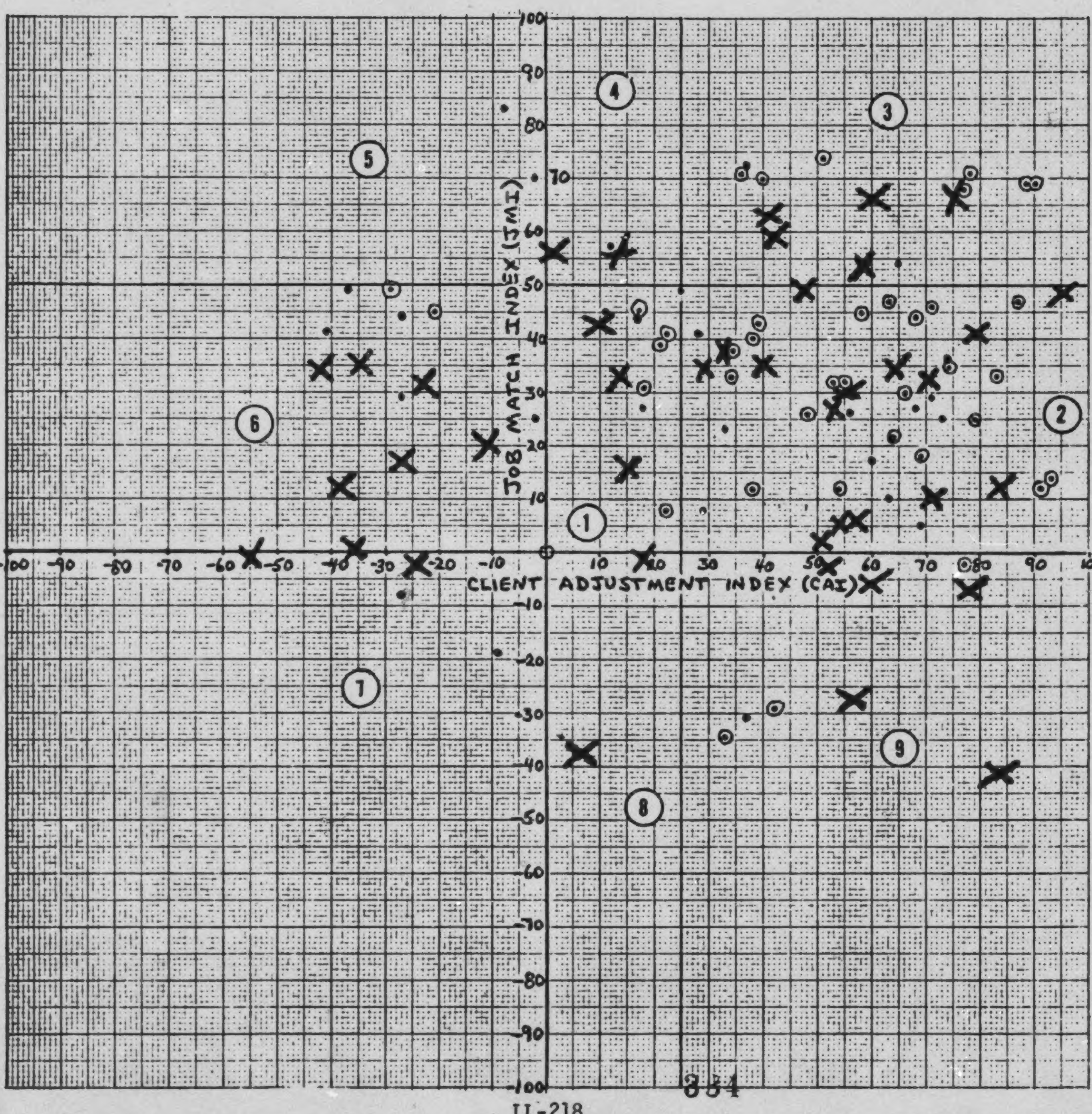
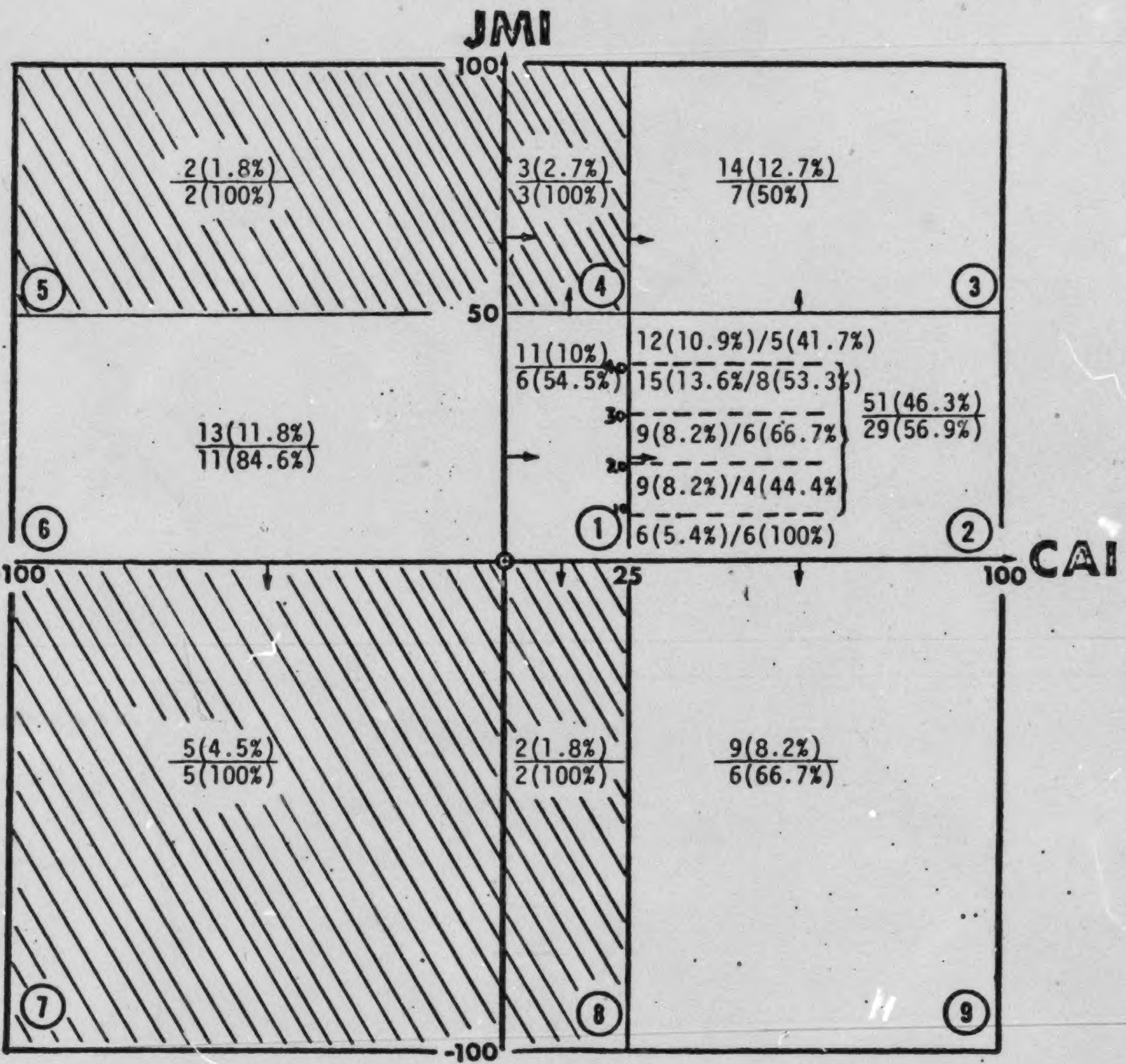


Figure 5-14. Distribution of Paired Observations: Client Adjustment Index (CAI) and Job Match Index (JMI)

- Total of 110 Observations
- As of December 10, 1974, 71 Had Terminated (64.5%)
- Numbers Above Line in Each Cell Are the Number of Observations and the Percent of Total Observations
- Numbers Below Line in Each Cell Are the Number of Terminations and Percent of Cell That Terminated


JMI
100
2(1.8%) / 2(100%)
3(2.7%) / 3(100%)
14(12.7%) / 7(50%)
⑤
④
③
50
13(11.8%) / 11(84.6%)
11(10%) / 6(54.5%)
12(10.9%)/5(41.7%)
40
15(13.6%/8(53.3%)
30
9(8.2%)/6(66.7%
20
9(8.2%)/4(44.4%
10
6(5.4%)/6(100%)
51(46.3%) / 29(56.9%)
⑥
①
②
-100
25
100
CAI
5(4.5%) / 5(100%)
2(1.8%) / 2(100%)
9(8.2%) / 6(66.7%)
⑦
⑧
⑨
-100

5.4.3 Job Retention Time and Job Match Index: Exponential Analysis

An alternate way of viewing the job-retention time parameter is to consider it from the standpoint of a life-testing problem. Thus, one considers the length of time employed on a job in a similar way to the classic "lightbulb" test where a given number of units are turned on at a particular time and one records the time-to-failure (or, in this case, time-to-job-termination) as a result. After a sufficient number of terminations have been observed, the exponential distribution may, for example, be fitted to the observed data as a method of relating the various indices to job retention.

Table 5-18[1] presents a tabulation of the observed job-retention times as of December 10, 1974 (the terminations are shown in italics) classified as a function of JMI intervals of 10%. For each interval, the estimated exponential parameter (job-retention time per termination) was calculated. For each interval, this is done by computing the total time worked (both for the "terminated" and "still working") and dividing this total by the number of terminations observed for the interval. (Figure 5-15 shows the exponential parameter histogram.)

As can be seen, the average retention time does appear to increase significantly as JMI increases. The observed increase is not uniform, however, due to the small cell sizes. A gross significance test may still be applied to the data in order to test the increase by combining some of the adjacent intervals in order to increase sample size and hence the precision of the retention-time estimates.

For example, consider a cut-point at JMI = 0, which results in the following combined retention-time averages:

JMI	Σ Days Worked	No. of Terminations	Average Retention Time (Days)	"F" Ratio	Sig.
≥ 0	33,895	76	446.0	1.81	+
< 0	4,438	18	246.6		

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[1] Note: The class interval boundaries utilized in this analysis are greater than or equal to the lower class limit and less than the upper class limit. Thus, the class intervals used are not the same as was shown in Figure 5-2 and Table 5-10.

TABLE 5-18. EXPONENTIAL ANALYSIS: OBSERVED RETENTION TIME (IN CALENDAR DAYS) VERSUS JOB MATCH INDEX

Note: -Terminations shown in italics

-Retention as of December 10, 1974

JOB MATCH INDEX

	-.7 – -.6	-.6 – -.5	-.5 – -.4	-.4 – -.3	-.3 – -.2	-.2 – -.1	-.1 – 0	0 – .1	.1 – .2	.2 – .3	.3 – .4	.4 – .5	.5 – .6	.6 – .7	.7 – .8	.8 – .9	.9 – 1.0
	0		*58*	*23*	*6*	*0*	*6*	*19*	*21*	*1*	*9*	*24*	*6*	*9*	*70*	*145*	
				39	*14*	*308*	*6*	*6*	*3*	*96*	*9*	*14*	*29*	*88*	*111*		
				204	*60*	*584*	*30*	*27*	*21*	*92*	*4*	*73*	*21*	*111*	*149*		
				582	596	582	*12*	*51*	*77*	*124*	*6*	*71*	*54*	*194*	*193*		
					573		*14*	*75*	*86*	*156*	*25*	*136*	*128*	*272*	*234*		
							67	*154*	*93*	*291*	*31*	*161*	*174*	533	*364*		
							141	*178*	*112*	*206*	*35*	*165*	*148*	540	454		
							533	*449*	*186*	*227*	*48*	*132*	*141*	505	498		
								589	*468*	*333*	*39*	*140*		574	484		
									475	*364*	*60*	*151*		601	546		
									596	*381*	*71*	*257*			572		
									547	*410*	*116*	*200*					
									575	462	*232*	*515*					
									607	512	*367*	494					
										582	490	483					
										607	484	477					
											484	538					
											462	551					
											540	560					
											582	588					
											573	533					
											552	575					
											610	574					
											606	594					
											638	609					
$\sum D$	0		58	848	1249	1474	809	1548	3867	4844	7073	8615	701	3427	3675	145	
$\sum D/T$*	0		58	282.7	416.3	491.3	115.6	193.5	429.7	403.7	505.2	662.7	87.6	685.4	612.5	145	
N	1	0	1	4	5	4	8	9	14	16	25	25	8	10	11	1	142
T	1		1	3	3	3	7	8	9	12	14	13	8	5	6	1	94

*Job Retention Average

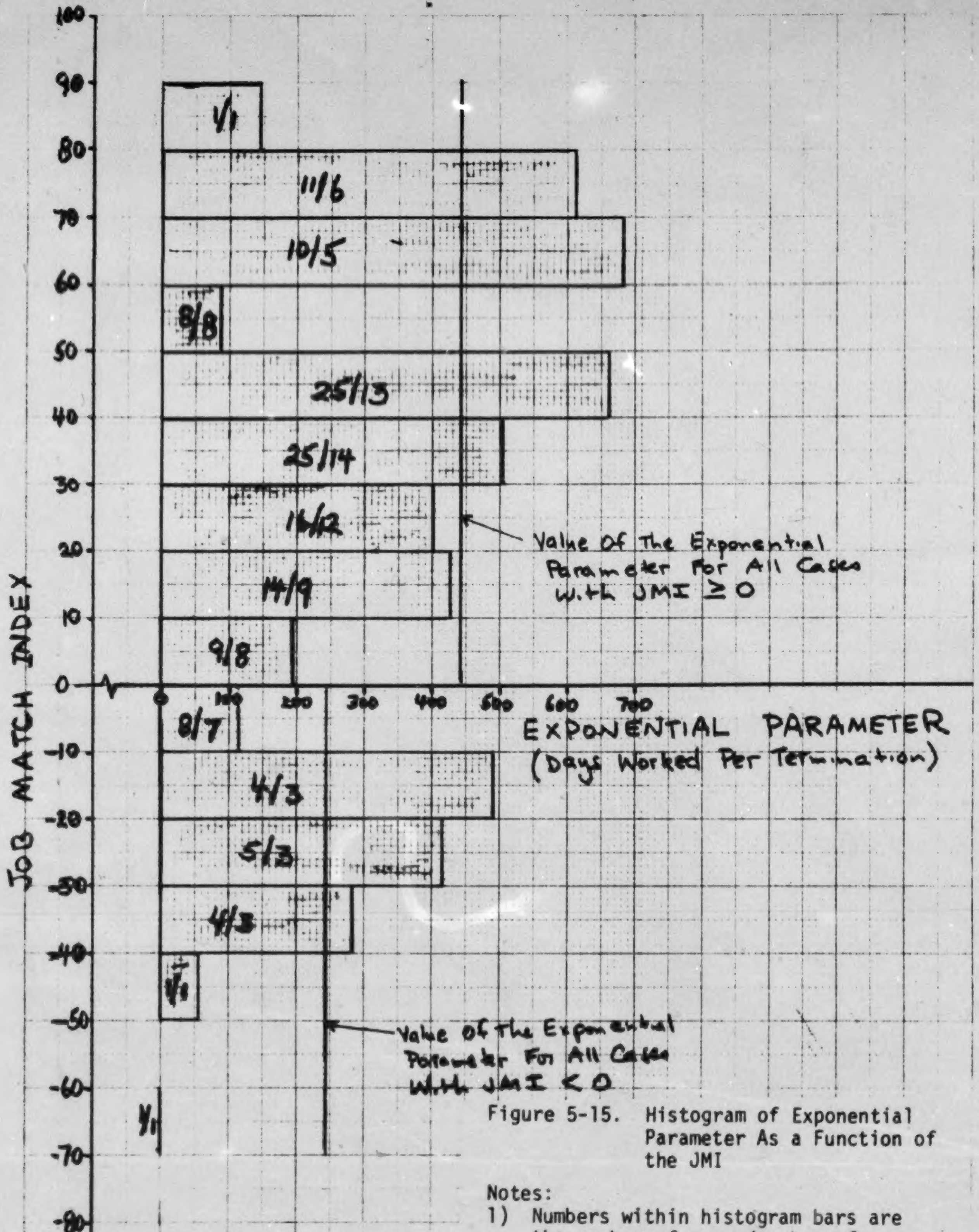

Figure 5-15. Histogram of Exponential Parameter As a Function of the JMI

Notes:

1) Numbers within histogram bars are the number of cases/number of terminations.
2) Data is as of December 10, 1974.
3) Class Interval is Lower Limit ≤ JMI < Upper Limit.

Table 5-19 shows the results obtained at the other three retention followup times.

TABLE 5-19

EXPONENTIAL ANALYSIS: COMBINED RETENTION-TIME AVERAGES

As of:	JMI	Days Worked	No. of Terminations	Average Retention (Time(Days)	"F" Ratio	Sig.
5-31-74	>0	24991	68	367.51	1.98	++
	≤ 0	3341	18	185.61		
2-28-74	>0	20101	62	324.21	2.09	++
	≤ 0	2789	18	154.94		
12-31-73	>0	16607	51	325.63	2.24	++
	≤ 0	2328	16	145.5		

Note: For the analyses done using the data obtained at the three earlier followup times, the JMI class interval boundaries were defined differently than was done for the data obtained as of December 10, 1974. The class intervals were defined as greater than the lower class limit and less than or equal to to the upper limit.

Tables 5-20 through 5-22 show the data distributions used in the calculations shown in Table 5-19.

The results given above follow the pattern established in the truncated analysis. One sees that the effect of the JMI decreases as the time period increases. This is akin to the truncated analysis results where the relationship difference for the JMI for those clients who worked less than or equal to "X" days and those who worked more than "X" days was maximum at about 60 days and decreased as "X" got larger.

5.4.4 Multivariate Regression Analysis

In order to further delineate the relative long-term effects of the CAI and JMI on job-retention time, the following multiple regression analyses were conducted using the final set of retention data obtained as of December 10, 1974.

1) Using only the 71 cases where the termination time was known (people had terminated) and the people involved had taken both SICLs.

2) Using all 110 cases where both SICLs were taken with those "still working" assigned a random future termination time based on an estimated exponential termination time delay function.

TABLE 5-20. EXPONENTIAL ANALYSIS: OBSERVED RETENTION TIME
(IN CALENDAR DAYS VERSUS JOB MATCH INDEX)
AS OF MAY 31, 1974

	JOB MATCH INDEX					
CATEGORY NO.	VALUE RANGE .GT.		.LE.	NO. OF PEOPLE	NO. TERMINATED	SUM OF DAYS EMPLOYED
1	.9	TO	1.0	0	0	0
2	.8	TO	.9	1	1	145
3	.7	TO	.8	8	5	1780
4	.6	TO	.7	13	5	3269
5	.5	TO	.6	7	7	573
6	.4	TO	.5	24	12	5811
7	.3	TO	.4	25	13	4964
8	.2	TO	.3	17	10	4277
9	.1	TO	.2	13	7	2649
10	.0	TO	.1	10	8	1523
11	-.1	TO	.0	9	8	643
12	-.2	TO	-.1	4	2	1122
13	-.3	TO	-.2	5	3	863
14	-.4	TO	-.3	4	3	655
15	-.5	TO	-.4	1	1	58
16	-.6	TO	-.5	0	0	0
17	-.7	TO	-.6	1	1	0
18	-.8	TO	-.7	0	0	0
19	-.9	TO	-.8	0	0	0
20	-1.0	TO	-.9	0	0	0
				142	86	

	T	D	D/T
JMI > 0	68	24991	367.51
JMI ≤ 0	18	3341	185.61

F = 1.98 ++

TABLE 5-21. EXPONENTIAL ANALYSIS: OBSERVED RETENTION TIME (IN CALENDAR DAYS VERSUS JOB MATCH INDEX) AS OF FEBRUARY 28, 1974

CATEGORY NO.	JOB MATCH INDEX VALUE RANGE .GT.		.LE.	NO. OF PEOPLE	NO. TERMINATED	SUM OF DAYS EMPLOYED
1	.9	TO	1.0	0	0	0
2	.8	TO	.9	1	1	145
3	.7	TO	.8	8	5	1504
4	.6	TO	.7	13	4	2465
5	.5	TO	.6	7	7	573
6	.4	TO	.5	24	12	4707
7	.3	TO	.4	25	13	3860
8	.2	TO	.3	17	6	3426
9	.1	TO	.2	13	7	2097
10	.0	TO	.1	10	7	1324
11	-.1	TO	.0	9	8	551
12	-.2	TO	-.1	4	2	938
13	-.3	TO	-.2	5	3	679
14	-.4	TO	-.3	4	3	563
15	-.5	TO	-.4	1	1	58
16	-.6	TO	-.5	0	0	0
17	-.7	TO	-.6	1	1	0
18	-.8	TO	-.7	0	0	0
19	-.9	TO	-.8	0	0	0
20	-1.0	TO	-.9	0	0	0
				142	80	

	T	D	D/T
JMI > 0	62	20101	324.21
JMI ≦ 0	18	2789	154.94

F = 2.09 ++

TABLE 5-22. EXPONENTIAL ANALYSIS: OBSERVED RETENTION TIME
(IN CALENDAR DAYS VERSUS JOB MATCH INDEX)
AS OF DECEMBER 31, 1973

JOB MATCH INDEX CATEGORY NO.	VALUE RANGE .GT.		VALUE RANGE .LE.	NO. OF PEOPLE	NO. TERMINATED	SUM OF DAYS EMPLOYED
1	.9	TO	1.0	0	0	0
2	.8	TO	.9	1	1	145
3	.7	TO	.8	8	2	1277
4	.6	TO	.7	13	3	1923
5	.5	TO	.6	7	6	546
6	.4	TO	.5	24	9	3964
7	.3	TO	.4	25	11	3130
8	.2	TO	.3	17	5	2732
9	.1	TO	.2	13	7	1743
10	.0	TO	.1	10	7	1147
11	-.1	TO	.0	9	8	492
12	-.2	TO	-.1	4	1	763
13	-.3	TO	-.2	5	3	561
14	-.4	TO	-.3	4	2	454
15	-.5	TO	-.4	1	1	58
16	-.6	TO	-.5	0	0	0
17	-.7	TO	-.6	1	1	0
18	-.8	TO	-.7	0	0	0
19	-.9	TO	-.8	0	0	0
20	-1.0	TO	-.9	0	0	0
				142	67	

	T	D	D/T
JMI > 0	51	16607	325.63
JMI ≦ 0	16	2328	145.5

F = 2.24 ++

The analyses of variance resulting from the above regressions are presented as Table 5-23.

For these regressions, the variables were defined as follows:

$$Y = (\text{Days Worked})^{1/2}$$

$$X_1 = \text{CAI}$$

$$X_2 = \text{JMI}$$

The square root transformation for the dependent variable Days Worked was applied in order to more nearly normalize the skewness for this parameter. A logarithmic transfunction would probably have been even better but was precluded since one of the observed Y's was "0" days. The CAI and JMI were both used "as is" since they don't approach -1 or +1 very closely and were already sufficiently close to being normally distributed for analysis purposes.

In the first analysis, neither of the indices is significantly related to retention time. The reason for this would appear to be that the effects of JMI on early termination (as noted in the earlier t-test analyses) has been diluted by the addition of the long-term termination data; while the "long-term" effect of the CAI cannot be seen since a considerable number of those with very high CAI are in the "still-working" category, and hence were not included in this particular analysis.

It was not considered to be statistically appropriate to include the "still-working" times with the "termination" times in a composite regression analysis due to the fact that the resulting distribution of days worked is being bounded on the upper end by the date when we did our last followup. (The frequency histogram shown in Figure 5-6 shows the U-shape distribution one would have, and hence would not be very reasonably represented by a normal distribution.)

In an attempt to overcome this problem, use was made of the exponential life-testing model which was discussed previously. Since the job-retention times seem to behave more or less in the same way as a life-testing decay, an exponential time decay function was fit to all 94 cases who had terminated.

TABLE 5-23 . ANALYSES OF VARIANCE FOR RETENTION TIME MULTIPLE REGRESSIONS

Y = (days worked)$^{1/2}$

X_1 = CAI

X_2 = JMI

(1) Using TERMINATION DATA ONLY (N = 71)

SOURCE	Degrees of Freedom df	Sum of Squares ss	Mean Square ms	F	SIG*
X_1 [CAI]	1	1.48	1.48	1	-
X_2 [JMI]	1	24.89	24.89	1	-
Resid	68	2408.19	35.41		
Total	70	2434.56			

MULTIPLE CORRELATION COEFFICIENT $\boxed{R = 0.104}$

(2) Using ALL DATA (N = 110)

Note: "Still-Working" Terminations Randomly Assigned Calendar Days Employed To Termination From Exponential Time Decay Function

SOURCE	df	ss	ms	F	SIG.*
X_1 [CAI]	1	1224.28	1224.28	9.94	++
X_2 [JMI]	1	357.79	357.79	2.91	-
Resid	107	13178.54	123.16		
Total	109	14760.61			

MULTIPLE CORRELATION COEFFICIENT $\boxed{R = 0.327}$

*Significance Code:

- = Source of variance NOT significant

+ = Source of variance SIGNIFICANT @ 95% Confidence Level

++ = Source of variance SIGNIFICANT @ 99% Confidence Level

The basic formulation of the use of the exponential distribution for the "life-testing" application is largely due to the work of B. Epstein.[1] The referenced paper presents the derivation of all of the formulas which were employed in the present application.

The basic exponential distribution is given by the following probability density function:

$$f(t) = \frac{1}{\theta}\, e^{\frac{-t}{\theta}} \qquad \underline{\text{where}} \qquad \begin{array}{l} t \geq 0 \\ \;\; < 0 \end{array}$$

This distribution has only one basic parameter, θ, which is termed the "mean life" and is sometimes also termed the "mean time between failure" (abbreviated MTBF). This parameter is estimated from the data by observing, in the present case, the total number of days worked by all clients (both terminated and still working) and dividing this by the total number of terminations observed.

Thus, we obtain:

$$\hat{\theta} = \frac{\text{Total Working Days (All Clients)}}{\text{Terminations}} = \frac{38{,}333}{94} = 407.8 \text{ days/termination}$$

(See the data presented in Section 5.4.3.)

Using this estimate, it is now possible to estimate the cumulative exponential decay function using the basic formula. Thus, the probability of a random client being employed for time t* can be presented as follows:

$$\hat{p}_{t*} = e^{-\frac{t*}{\theta}} = e^{-\frac{t*}{407.8}}$$

The first column of Table 5-24 presents the observed times of all clients who were still working as of December 10, 1974. Using the above formula for $\hat{p}_{t*}$, one obtains the estimated probability that

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[1] B. Epstein, "Estimation from Life Test Data," *Technometrics*, November 1960, pp. 447-54.

TABLE 5-24 . ESTIMATION OF RANDOM EXPONENTIAL CLIENT TERMINATION TIMES FOR THOSE "STILL WORKING" AS OF 12-10-74.

t^* (In Days)	$\hat{p}_{t^*}$	R	t (In Days)
582	.240	.8739	637
* 596	.232	.3123	1071
573	.245	.4442	904
582	.240	.9976	583
533	.271	.0963	1487
589	.236	.3830	980
475	.312	.0392	1796
596	.232	.8532	661
547	.261	.2118	1180
575	.244	.2253	1183
607	.226	.1285	1444
462	.322	.1041	1385
512	.285	.6425	692
582	.240	.1120	1475
* 607	.226	.2598	1157
490	.301	.5843	709
* 484	.305	.5967	695
484	.305	.4237	834
462	.322	.1945	1130
540	.266	.1155	1420
* 582	.240	.5028	862
573	.245	.9603	590
552	.258	.6236	745
610	.224	.0187	2233
606	.226	.7708	712
638	.209	.6629	806

t^*	p_{t^*}	R	t
494	.298	.8962	539
483	.306	.8146	567
477	.310	.1605	1223
538	.267	.4539	860
551	.259	.5926	764
560	.253	.3698	966
* 588	.236	.3393	1029
533	.271	.1691	1258
575	.244	.6142	774
574	.245	.9804	582
594	.233	.3321	1044
609	.225	.2611	1157
533	.271	.6043	738
540	.266	.8992	584
* 505	.290	.1825	1199
574	.245	.4967	859
* 601	.229	.0043	2823
* 454	.328	.0180	2092
498	.295	.4144	857
* 484	.305	.8555	548
546	.262	.1842	1236
572	.246	.8267	650

* Preference SICL Only

where:

t^* = last observed time at which client "still working" (Days)

$\hat{p}_{t^*}$ = estimated probability of surviving time t^* based on exponential decay = $e^{-\frac{t^*}{\ }}$

R = four-digit random number (A. Hald's Random Digit Tables)

$t = \ln \frac{1}{R\,\hat{p}_{t^*}}$ = estimated random client termination time a client has been employed the length of time, t^*, in a "still working" state. These estimated probabilities are shown as the second column of figures.

The third column presents a four-digit random number taken from A. Hald's random digit table.[1]

The product $R\hat{p}_{t^*}$ will thus represent a "random" point on the total remaining probability scale for total time worked which is greater than t^*. In order to find the time which corresponds to this random or "termination" point, we substitute $R\hat{p}_{t^*}$ for $\hat{P}_{t^*}$ in the formula, obtaining:

$$R\hat{p}_{t^*} = e^{-\frac{t^*}{407.8}} .$$

Solving this formula for t^*, which will now be denoted as $\hat{t}$, the following result is obtained which represents the desired "random" future termination time.

$$\hat{t} = \ln \frac{1}{R\hat{p}_{t^*}} .$$

The final column of Table 5-24 presents the values of $\hat{t}$ corresponding to each of the individual client still-working times, t^*.

Figure 5-16 shows the frequency histogram of days worked till termination. The crosshatched area pertains to the actual observed terminations. The other area pertains to the distribution obtained from the above methodology.

Using the random termination times, $\hat{t}$, from Table 5-24 for each of the "still-working" cases, a second regression was conducted using the resulting 110 case composite groups; i.e., the actual terminations and the estimated.

The results of the second regression were also presented in Table 5-23. These regressions indicate the expected result as previously seen in the "t"-test; i.e., that for long-term job retention, it is the CAI index which is statistically significant.

A. Hald, *Statistical Tables and Formulas*, New York: John Wiley & Sons.

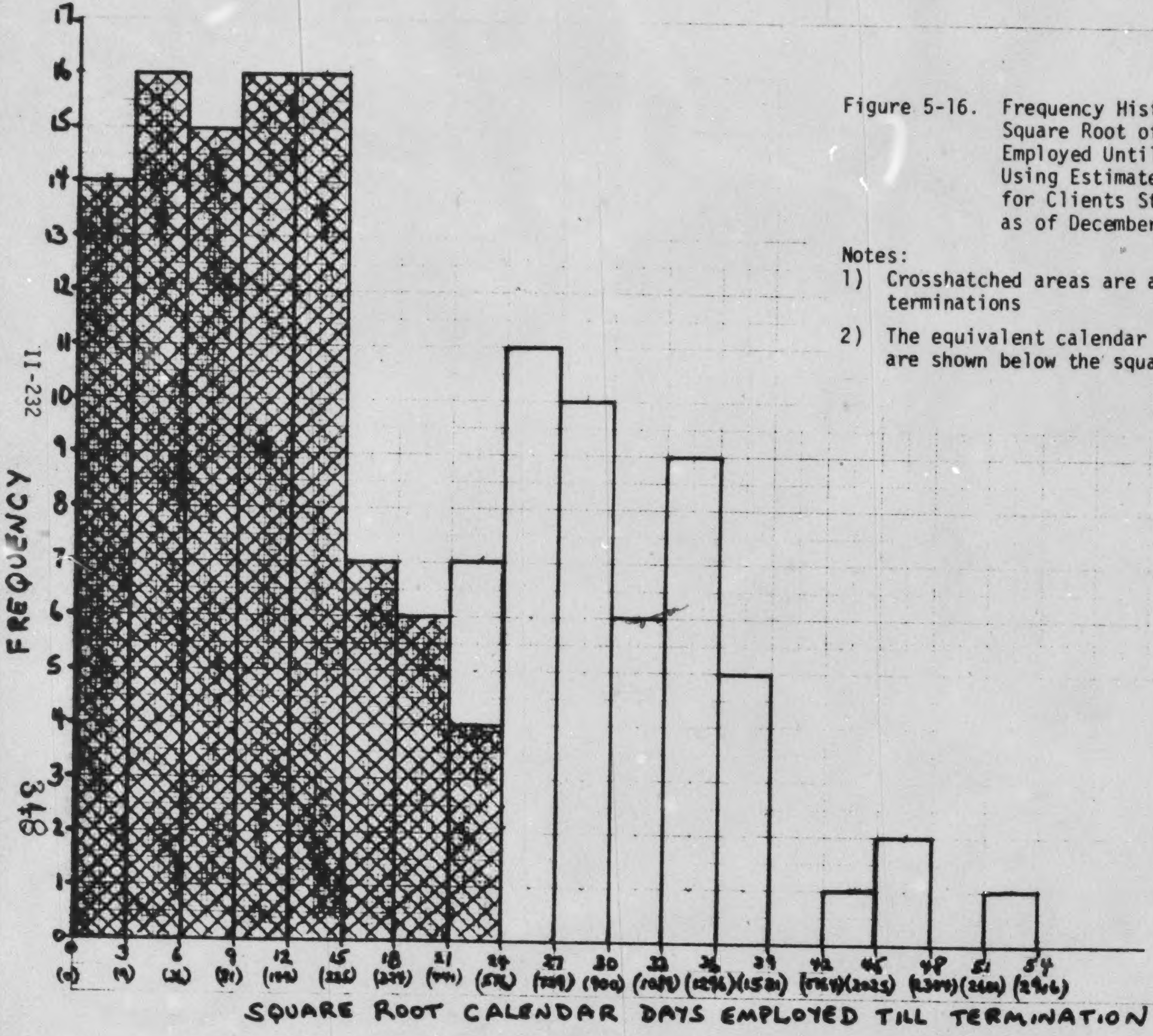

Figure 5-16. Frequency Histogram of Square Root of Calendar Days Employed Until Termination Using Estimated TErminations for Clients Still Working as of December 10, 1974

Notes:

1) Crosshatched areas are all known terminations

2) The equivalent calendar days employed are shown below the square root values.

As a further measure of the effect of "Restriction" on the first data set which used only the job-terminated cases, an "unrestricted" estimate of the correlation was performed using the following correction formula."[1]

$$R_{12} = \frac{r_{12}\left(\frac{S_1}{s_1}\right)}{\sqrt{1 - r_{12}^2 + r_{12}^2 \left(\frac{S_1^2}{s_1^2}\right)}}$$

where:

R_{12} = the desired correlation between 2 parameters (1,2) based on an "unrestricted" range of parameter 1

r_{12} = the observed correlation of parameter 1 and 2 based on the "restricted" range of parameter 1

s_1 = the observed "restricted" standard deviation of parameter 1

S_1 = the value of the "unrestricted" standard deviation of parameter 1

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[1] J. R. Guilford, *Fundamental Statistics in Psychology and Education*, 4th edition. New York: McGraw-Hill, c. 1965, pp. 341-45.

If one takes the "restricted" correlation estimate of 0.104 and uses the estimated ratio (1.97) of the unrestricted standard deviation (based on the randomly extended exponential retention times) to the restricted standard deviation (using terminations only), the corrected estimate of correlation becomes:

$$\hat{R}_{12} = \frac{0.104\ (1.97)}{\sqrt{1 - (0.104)^2 + (0.104)^2\ (1.97)^2}} = \underline{\underline{0.202}}$$

Although this is not as large as the actual computed correlation using the estimated extended times, it does represent about a factor of two times the original correlation observed using terminations only. The reason it underestimates the actual is probably due to the fact that the data points absent from the restricted case are heavily weighted with high values of the CAI.

5.4.5 Termination Reasons: Data and Analysis

The retention analyses presented so far have all been done independent of the reason for termination. As discussed earlier, Ultrasystems obtained the reason for termination from the employer. The reasons given by the employer and the number of terminations associated with each reason are shown in Table 5-25. This table also shows the distribution of the terminations by reason against the number of calendar days employed. Examining the reasons for termination, one sees that there are many cases in which the exact reason is not discernible.

As an example, one sees that the largest category of terminations by reason is "Quit No Reason Given" (i.e., there were 17 terminations in this category, which is 18.1% of the total of 94 terminations). In addition, there were two (2) terminations for which no reason was given by the employer (labelled INA in Table 5-23, line 13), and there were 10 terminations for whcih the reason given was either Voluntary Termination or Terminated By Company-No Reason Given. Thus, there was a total of 29 terminations (30.8% of the total terminations) for which the "real" reason is not clear. In other words, the reason for these terminations could have been the same as another reason listed, i.e., Quit-No Reason Given could have been a reason such as Didn't Like Job or Quit To Go To School or Quit To Get Married, etc.

In addition to this problem, there is of course the question of the real validity of these reasons. As stated, these reasons were given by the employer. Since the people themselves were not contacted, no check on the reason is available. One should note that whereas also obtaining a reason for termination from the person would be a great help it is, in Ultrasystems' opinion, likely that in many cases the reason given by the person will differ from that given by the employer. As an example, the employer reason Did Not Qualify might be contradicted by the person giving a reason such as Didn't Like the Job or The Company or Their Supervisor. That there would have been a difference in perspective between the two respondents is, as stated, our opinion and is obviously not supported by any data we obtained.

Aside from these two issues, the reasons for terminations given also show that there were two people who never reported for work, four who were terminated when the business closed[1] and seven who were

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[1] All four of these people were employed in the same type of job at the same company. The company did not actually go out of business; rather, they shut down operations at the physical location where the four people were employed. The company maintained operations at another plant located approximately 60 miles from the one closed down.

TABLE 5-25. TERMINATION REASONS AND DISTRIBUTION OF DAYS EMPLOYED BY SUCH REASON

Line Number	Termination Reason	Ultra Code Nos.	Total Term.	Calendar Days Employed								
				0-30	31-60	61-90	91-120	121-199	200-299	300-399	400-499	500-599
1	Did Not Qualify	12	8	4		2			1	1		
2	Not Dependable	16	3			1	1			1		
3	Didn't Like Job	17	1	1								
4	Personality Problem	30	1					1				
5	Abseenteeism And/Or Tardiness	7,8,28	6	2	2	1						1
6	Quit-No Reason Given	13	17	7	3	1	2	3	1			
7	Voluntary Termination	24	6					3	1	1	1	
8	Terminated By Company-No Reason Given	26	4	2		1					1	
9	Never Reported For Work	1	2	2								
10	Business Closing	5	4	3								
11	Laid-Off Lack of Work	4	6			1	2	3				
12	Company Had Financial Problems	27	1		1							
13	INA	22	2	1						1		
14	Temporary Hire	20	4					2	2			
15	Found Better Job	11	3				1			1		1
16	Quit To Go To School	25	4		1			1	1		1	
17	Went Into Own Business	19	1		1							
18	Went On Personal Leave-Never Came Back	21	1			1						
19	Went On Personal Leave-Took Too Long Coming Back	18	2					1	1			
20	Personal Reasons	6	5	2				2	1			
21	Left Area	14	3	1				2				
22	Quit To Get Married	10	4	1	1	1		1				
23	Pregnancy	29	1						1			
24	No Driver's License	2	1		1							
25	Language Problem	31	1					1				
26	Violated Probation	23	1				1					
27	Falsified Birth Cert.	3	1		1							
	Total			28	10	9	7	20	9	6	3	2
	Cumulative Total			28	38	47	54	74	83	89	92	94

terminated because of lack of work (or financial problems), and four who were hired on a temporary basis.

The key issue here has to do with the measures about the person, the job, and the match between them that the CJMS is designed to provide and the inclusion in the data base of employment histories where the reason for termination is independent of the system measures. Because of the relatively small number of total cases in the data base, it is, in Ultrasystems' opinion, extremely important that one examine the effect on the retention-system score analyses of the terminations due to causes not associated with the measures provided. In other words, the people terminated because the company shut down the plant would apparently have been terminated no matter how well they were performing on the job. Because many of the termination reasons are not that clear and because the reasons were obtained only from the employer, the disaggregation of the data base by reason for termination is subject to question. Given the benefit of hindsight, it appears that the analysis would have gained considerably from the capture of additional data. In addition to obtaining the person's reason for termination, it would have been valuable to obtain measures of job performance and job satisfaction from the person and for the performance from the employer. These measures were part of the original evaluation design specified for the New Jersey experiment's evaluation. That they were not included in the SER experiment's evaluation is unfortunate. It should be noted that SER stated as a groundrule for their participation that Ultrasystems was not to contact their clients. However, measures of job performance could have been obtained from the employer.

The analyses presented earlier in this section have shown that there are statistically significant relationships between the eventual retention of a person and the measures about the person and their match to the job provided by the Cleff system. It is important, therefore, to determine if there are statistically significant differences between the people who were terminated for reasons that appear on face value to be independent of the measures provided by the CJMS. In other words, it is possible that the system scores for the people terminated for such reasons as Laid Off Lack of Work and Business Closing could by chance be biasing the results given the absence of any causal relationship between the reason the person was terminated and the person's behavioral association with the job.

Analyses were undertaken to determine what the effects of removing two sets of terminations, based on the reason for termination as given, would be on the results obtained from the truncated analysis presented earlier (in Section 5.4.2). The following two sets of terminations were excluded:

Group 1: Truncated Analysis Excluding Terminations for the Following Reasons:

Line Number[1]	Termination Reason (Ultra Code Number in Parentheses)	Number of Terminations
9	Never Reported For Work (1)	2
10	Business Closing (5)	4
11	Laid-Off-Lack-Of-Work (4)	6
12	Company Financial Problems (27)	1
13	INA (22)	2
14	Temporary Hire (20)	4
	Total	19

Group 2: Truncated Analysis Excluding Terminations for the Following Reasons:

Line Number[1]	Termination Reason (Ultra Code Number in Parentheses)	Number of Terminations
16	Quit To Go To School (25)	4
17	Went Into Business (19)	1
21	Left Area (14)	3
22	Quit To Get Married (10)	4
23	Pregnancy (29)	1
24	No Driver's License (2)	1
25	Language Problem (31)	1
26	Violated Probation (23)	1
27	Falsified Birth Certificate (3)	1
	Total	17

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[1] Line Number refers to Table 5-25.

Table 5-26 shows the pertinent condescriptive statistics for the Group 1 and 2 termination cases and the remainder of the terminations. Using the t-test to test for significant differences between the means of the measures shown, between the termination groups, yielded no significant differences (as shown in the table). There was, as can be seen, reasonable uniformity between the mean values of the CJMS indices except the Job Match index between the termination groups. One sees that the mean Job Match Index for the Group 1 terminations was much lower than for the Case 2 or All Other terminations (All Other means all terminations excluding those contained in Group 1 or 2). The data shown in Table 5-26 masks the distribution over the indices over the calendar days days employed. As an example, examining the JMI indice between the Group 1 terminations and the remainder of the terminations, for those people who were employed ≤ 60 calendar days yields the following:

	Cases Employed ≤ 60 Days	
	Group 1 Terminations	Remainder of Terminations
Ƶ(JMI)	−.1265	.222
s	.3165	.322
n	8	30

$$t = -2.73$$

sig ++

(Note: In the above, the remainder of the terminations includes the Group 2 terminations.)

One should bear in mind that the two people who never reported to work are unique cases in the sense that the reason for termination explicitly determines the number of calendar days employed, i.e., zero. Table 5-27 shows the truncated analysis resulting from the removal of these two cases.[1] Comparing the results given in Table 5-27 with those presented earlier in Table 5-16, one sees

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[1] Note: These two cases involve people who only took the preference SICL. Hence, the previous results shown for the client adjustment and difference indices are not affected by these two cases.

TABLE 5-26. CONDESCRIPTIVE STATISTICS FOR CLIENT AND JOB MATCH INDICES FOR TERMINATIONS GROUPED ACCORDING TO REASON FOR TERMINATION

	Z(CAI)	Z(CDI)	Z(JMI)	Z(JDI)	Days
Group 1 Term					
$\bar{x}$	.382	41.81	.192	60.83	8.66
s	.469	12.12	.411	13.66	5.74
n	14	14	19	19	19
Group 2 Term					
$\bar{x}$	.322	48.58	.357	60.51	11.26
s	.524	14.33	.339	12.93	4.85
n	12	12	17	17	17
All Other Terminations					
$\bar{x}$	.368	47.29	.313	58.43	9.70
s	.0945	15.60	.341	14.70	5.92
n	45	45	58	58	58
Total Terminations					
$\bar{x}$	.363	46.47	.296	59.29	9.772
s	.300	14.62	.356	14.09	5.706
n	71	71	94	94	94
Group 1 and All Others					
t	.192	−1.20	−1.27	.628	−.669
sig	—	—	—	—	—
Group 2 and All Others					
t	.568	.258	.468	.526	.992
sig	—	—	—	—	—

TABLE 5-27. ANALYSIS OF CLEFF SYSTEM SCORES VERSUS LENGTH OF TIME WORKED (TIME WORK CATEGORIZED IN TWO DISCRETE INCREMENTS) EXCLUDING TWO TERMINATIONS WHO NEVER REPORTED FOR WORK

	Z(JMI)	Z(JDI)
0-30 $\bar{x}$	.203	59.30
x	.305	13.03
n	26	26
>30 $\bar{x}$	.378	58.34
s	.317	13.03
n	114	114
t	2.56	–.34
sig	++	–
0-60 $\bar{x}$	.183	61.21
s	.316	15.02
n	36	36
>60 $\bar{x}$	.402	57.78
s	.314	12.33
n	104	104
t	3.60	–1.36
sig	+++	–

that the confidence level of the difference between the means of the JMI is reduced by excluding these two cases. However, the confidence level at the 60-day truncation point is still greater than 99.9%.

Tables 5-28 and 5-29 show the complete truncated analyses resulting first from the removal of the Group 1 cases from the data base and then the removal of both Group 1 and 2 cases, respectively. If one compares these results with those presented in Tables 5-16 and 5-17, one sees the following:

1) The relationship between the early retention and the Job Match Index was still significant (i.e., higher job match indices tended to remain employed over the initial 120-day period with greater frequency), although the confidence levels associated with the difference between the means was reduced.

2) The relationship between the eventual termination and the Client Adjustment Index was not significantly different.

Thus, the removal from the data base of the clients terminated for reasons that appear on face value to be somewhat independent of the behavioral relationships between the client and the job (and between the client's preferences and experiences) do not negate the relationships determined earlier. For the JMI, they do reduce the confidence levels associated with the mean differences. It is important to keep in mind, however, that there are still serious questions about the terminations remaining after the two specified groups were removed. The analyses have not been continued because Ultrasystems believes one cannot determine enough from the remaining termination reasons, as given, to make any more decisions as to the relationship between the reason and the measures provided by the CJMS. Ultrasystems does not mean to imply either that there aren't some lingering doubts about the termination cases included in the two groups specified. However, to simply ignore the reason for termination in doing this type of analysis is not acceptable. The results obtained based on our decisions regarding the termination reasons to be excluded do show that the statistical differences resulting from ignoring the reason for termination, while not eliminated or contradicted, are weakened. Obviously, more complete termination reasons and some measure of job performance would enable one to better analyze the relationships. In addition, a larger sample would of course also help.

TABLE 5-28. ANALYSIS OF CLEFF SYSTEM SCORES VERSUS TIME WORKED EXCLUDING ALL GROUP 1 TERMINATIONS

(Note: Data is for 123 cases, of which 96 took both SICLs)

		Z(CAI)	Z(CDI)	Z(JMI)	Z(JDI)
0-30	$\bar{x}$	.299	49.13	.244	59.92
	s	.435	14.45	.314	13.68
	n	19	19	21	21
>30	$\bar{x}$	.531	41.39	.379	58.15
	s	.515	14.72	.323	13.27
	n	77	77	102	102
	t	1.80	−2.06	1.75	−.56
	sig	+	+	+	+
0-60	$\bar{x}$	.294	48.30	.222	61.10
	s	.460	13.99	.322	15.16
	n	26	26	30	30
>60	$\bar{x}$	.556	40.93	.399	57.59
	s	.508	14.85	.314	12.61
	n	70	70	93	93
	t	2.30	−2.19	2.66	−1.26
	sig	+	+	++	—
0-90	$\bar{x}$	.416	45.35	.242	61.04
	s	.532	15.08	.318	14.76
	n	31	31	38	38
>90	$\bar{x}$	.518	41.77	.407	57.29
	s	.495	14.80	.316	12.51
	n	65	65	85	85
	t	.92	−1.10	2.67	−1.45
	sig	—	—	++	—

TABLE 5-28 (continued)

		ƶ(CAI)	ƶ(CDI)	ƶ(JMI)	ƶ(JDI)
0-120	$\overline{x}$	.396	45.42	.253	60.41
	s	.557	15.48	.321	14.59
	n	34	34	43	43
>120	$\overline{x}$	.534	41.56	.408	57.40
	s	.475	14.55	.315	12.52
	n	62	62	80	80
	t	1.28	−1.22	2.49	−1.20
	sig	—	—	++	—
0-199	$\overline{x}$	.355	46.95	.336	57.83
	s	.140	15.84	.344	14.31
	n	43	43	58	58
>199	$\overline{x}$	.590	39.66	.374	59.00
	s	.470	13.40	.306	12.41
	n	53	53	65	65
	t	3.17	−2.44	0.65	0.48
	sig	+++	++	—	—
All Term.	$\overline{x}$	.358	47.62	.323	58.90
	s	.247	15.05	.339	14.26
	n	57	57	75	75
Still Working	$\overline{x}$	.670	36.15	.407	57.75
	s	.458	11.62	.295	11.75
	n	39	39	48	48
	t	4.32	−4.01	1.41	−.46
	sig	+++	+++	—	—

TABLE 5-29. ANALYSIS OF CLEFF SYSTEM SCORES VERSUS LENGTH OF TIME WORKED EXCLUDING GROUP 1 AND 2 TERMINATIONS

(Note: Data is for 106 cases, of which 94 took both SICLs.)

Job Retention Time in Days		Ƶ(CAI)	Ƶ(CDI)	Ƶ(JMI)	Ƶ(JDI)
A) 0-30	$\bar{x}$	.350	47.98	.262	59.19
	s	.385	13.95	.324	13.97
	n	18	18	19	19
>30	$\bar{x}$	.551	40.52	.376	57.89
	s	.525	14.86	.321	13.33
	n	66	66	87	87
	t	1.52	−1.91	1.39	−.38
	sig	—	+	—	—
B) 0-60	$\bar{x}$	.355	46.65	.245	59.16
	s	.435	14.02	.324	15.29
	n	22	22	24	24
>60	$\bar{x}$	.563	40.50	.388	57.82
	s	.517	14.99	.318	12.87
	n	62	62	82	82
	t	1.68	−1.68	1.93	−.43
	sig	+	+	+	—
C) 0-90	$\bar{x}$	.472	43.88	.260	59.43
	s	.518	15.17	.322	15.01
	n	26	26	31	31
>90	$\bar{x}$	.524	41.32	.395	57.58
	s	.500	14.85	.318	12.73
	n	58	58	75	75
	t	0.43	−.72	1.99	−.64
	sig	—	—	+	—

TABLE 5-29 (continued)

Job Retention Time in Days		Ƶ(CAI)	Ƶ(CDI)	Ƶ(JMI)	Ƶ(JDI)
D) 0-120	$\bar{x}$	.416	44.94	.282	58.74
	s	.540	15.21	.327	14.90
	n	28	28	35	35
>120	$\bar{x}$	.554	40.70	.392	57.81
	s	.482	14.68	.317	12.68
	n	56	56	71	71
	t	1.19	–1.23	1.67	–.33
	sig	—	—	+	—
E) 0-199	$\bar{x}$	.356	47.17	.324	57.34
	s	.274	16.15	.335	14.47
	n	34	34	45	45
>199	$\bar{x}$	.612	38.68	.379	58.70
	s	.466	13.08	.315	12.62
	n	50	50	61	61
	t	2.88	–2.65	.87	.52
	sig	++	++	—	—
All Term.	$\bar{x}$	.368	47.29	.313	58.43
	s	.094	15.60	.341	14.70
	n	45	45	58	58
Still Working	$\bar{x}$	.670	36.15	.407	57.75
	s	.458	11.62	.295	11.75
	n	39	39	48	48
	t	4.33	–3.66	1.50	–.26
	sig	+++	+++	—	—

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Appendix D - Statement of Work contained in OEO RFP PD 72-54 for the evaluation of the New Jersey/Cleff experiment.

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Appendix E - Instructions for administering the Self-Interview Checklist (SICL) and the Job Outline Checklist (JOCL) prepared by ADP-PDS (November 1972).

Appendix F - A document prepared by ADP-PDS, Inc. describing the interpretation of the results of the CJMS and its use in vocational guidance and placement. (November 1972)

APPENDIX A

Published article describing development, initial validation, and use of the Cleff Job Matching System.

"Job/Man Matching in the 70's," Samuel H. Cleff and Robert M. Hecht, *Datamation*, February 1, 1971 (Volume 17, Number 3), Technical Publishing Company, Barrington, Illinois.

It's time to change those personnel selection techniques we developed in the '20s

Job/Man Matching

The two-and-a-half decades since World War II have seen the greatest technological revolution in man's history. Yet the ideas and techniques applied to industry's single largest problem—the recruiting, screening, and selection of manpower—developed in the '20s and brought to fruition in the Depression of the '30s, are still with us in the '70s.

The tremendous labor pool of the Depression decade permitted management the luxury of hiring one in twenty—the "most qualified," perhaps in reality the most "over-qualified." Still in widespread use, the techniques which suited the years of large labor pools are maladaptive in these times of full employment when a 5% unemployment rate is considered a dire sign of recession. The expensive symptom of this maladaptive set of employment practices is the high level of labor turnover among all classes of worker, but particularly among the semi- and low-skilled, both white and blue collar. It is estimated that today workers under 35 change jobs on the average of once in one-and-a-half years, while those over 35 stay on their jobs only about twice as long.

The cost . . . is probably billions of dollars annually.

During the particularly tight labor market of the Korean War years, when employment at a General Electric Co. plant in Schenectady soared above 35,000, a management study of employee turnover revealed that in order to fill the "last 5,000 jobs" on the payroll 17,500 to 25,000 people were hired in one year! And this occurred a decade before the "discovery" of the hard-core unemployed. In today's labor market, employer after employer has revealed that virtually every business has its own trigger point, that when employment passes a certain level an annual ratio of between 3.5 and 5.0 hires per job is not unusual. In one situation, an employer with whom we worked has a job category in which he experiences over 700% turnover per year. The cost for the entire economy—in recruiting, training, rework, scrap, union grievances, lower productivity, turned-off customers, low morale—is probably billions of dollars annually.

The problem is just as severe for the job-seeker. That people frequently seek and find low- and semiskilled jobs on a hit or miss, trial and error basis has long been known. In simpler times it was possible for a job-seeker to have some knowledge of the content of many of the jobs he was likely to get—in these times he is fortunate if he knows the real requirements of more than a handful of jobs. So he searches by trial and error. And because it is relatively easy to get another job at about the same pay level, he tries and errs and moves on to another trial and so forth.

That management often tends to hire on the same basis, with little or no attention given to the work-content preferences of the people at low- and semiskilled levels is—by definition—equally true; these people do not hire themselves. The Black Revolution of the '60s was as much a revolt against the irrelevance of the employment practices of industry as against any other single factor.

The National Association of Manufacturers was struggling with the oft-heard complaints of their members about the cost of turnover. At the same time that it was turning its social concern to the problem of hard-core unemployment, NAM, aware that it was dealing with two sides of the same coin, took upon itself the responsibility to develop a solution. In 1966, Richard Cornuelle and Wright Elliot led this effort through the Center for Independent Action. Michael

in the '70s

by Samuel H. Cleff and Robert M. Hecht

Youchah, computer and systems consultant to both NAM and to the New Jersey Department of Labor and Industry, was assigned by both groups to find a way to harness the computer to the solution of the problem of matching people and jobs. The NAM, at Youchah's suggestion, took the safest and wisest of research and development approaches—two completely different solution directions at the same time and in parallel. The first was a computerization of the traditional extrinsic job labels, experience, education, etc., approach; the second was "way out," scrapping all but the intrinsic essence of the traditional, using the computer as a machine tool.

. . . a revolt against the irrelevance of the employment practices of industry . . .

The GE Missile and Space Division was asked to propose an r&d outline for the nontraditional approach. Under the direction of Louis Cimino, the division put together a conceptual approach and converted it into a proposal to NAM. Thus, in the spring of 1966, there began what was to be a most significant and successful research program into the manpower selection process, completely supported by private, nongovernment funding provided by NAM, Lilly Foundation and The Stern Family Fund.

The objective of the research was to determine whether and how jobs and job applicants could be matched at the semi- and low-skilled levels in both white and blue collar jobs to assure a higher degree of job satisfaction for successful applicants and, simultaneously, higher productivity and lower costs for employers.

Underlying the research was a basic, common sense principle, long part of our industrial folklore but never verified scientifically and consistently ignored in practice by both people seeking jobs and employers with jobs to fill.

The principle is this:

In looking for work (as elsewhere in life), people seek out those activities in which they feel they are more likely to be successful. Conversely, they avoid those activities in which they feel less likely to be successful. Occupationally well-adjusted people—those who like what they do and believe they are doing it well—are significantly more likely to do a better job for their employers, and to stay on their jobs longer, than people who are occupationally maladjusted—those who do not like what they do and believe they are not doing well.

A broad cross section of 29 national and local employers in the Indianapolis area provided a variety of jobs to be filled and real life job situations for analysis. Seven Indianapolis employers[1] and the EDP Division of Honeywell, Inc., in Brighton, Mass., cooperated fully in a separate study (Project Indianapolis) to validate initial findings.

In all, the research and development program—formulation of hypotheses, experimentation, statistical analyses, verification—lasted some two-and-one-half years and produced two major results.

First, a universal "language" or common set of variables, was invented for *describing in identical terms* the actual activities content of *any* semi- to low-skilled job in the economy—and the actual activities previously performed and currently preferred by people who seek to fill that job (or who fill it now).

Second, the basic principle underlying the research was found valid. Occupationally well-adjusted people whose activities preferences and history match job activities requirements do tend to stay on their jobs longer and do tend to be identified consistently by their supervisors as "successful." Such individuals can now be identified accurately in advance through use of job applicant profiles made possible by the universal language.

---

[1] The Indiana National Bank; L. S. Ayres and Company; College Life Insurance Co. of America; General Motors Corp. (Allison Division); Indiana Bell Telephone Co.; RCA; and Western Electric.

Male or female, black or white, urban or rural, high school graduate or elementary school drop out, hard-core unemployed or steadily employed–*all* can be described in terms of both an activities experience profile and an activities preference profile. Both profiles can be computer-matched against either white collar or blue collar job profiles written in the same language.

Further, this language permits mathematical comparison not only of job and job applicant, but of job and job (within and between companies), and applicant and applicant.

What follows is a brief technical description of how the Cleff Job Matching System was developed and how it can be applied to the mutual benefit of employers with jobs to fill and the applicants seeking jobs. Detailed statistical reviews of all reported findings are available in a technical paper.

Neither the employer who has gone through half-a-dozen hires to fill a single job satisfactorily nor the five misplaced previous hires need to be convinced that something is wrong with the system. In fact, a lot is wrong with it.

While Project Indianapolis was still in the early discussion stage, certain basic facts demanded recognition:

1. Not only was available research scanty, but no successful attempt had ever been made to build a system of organizing concepts which treated the field of human resources management in a systematic way, with experimentally testable solutions to problems faced daily by employers, employees and job seekers.

2. Job titles, which now total 42,500 as listed in the U.S. Employment Services' *Dictionary of Occupational Titles*, have more and more become social labels, and less and less useful in describing the job itself. Thus, a "building engineer" mops down the halls and a "fireman" on a diesel locomotive does–what???

For these and related reasons, it was agreed at the outset that standard hiring and job seeking methods, with their reliance on hope, hunch and tradition, had become increasingly obsolete. The research and development objectives for Project Indianapolis therefore were drawn as follows:

1. To investigate an analytical approach and develop the basic methodology for matching people and jobs at the low- and semi-skilled levels.

2. To validate these concepts and methods and to develop a mechanizable operational model for matching people and jobs at these levels.

A systems analysis approach was taken toward meeting these objectives. Statisticians familiar with Indianapolis were hired to develop representative samples of available jobs and chronically unemployed job seekers. With the help of the 29 cooperating employers, a sample of 57 open job categories was selected. Then social workers from Flanner House interviewed a sample of 150 chronically unemployed people, black and white, male and female, who might be considered for those jobs.

Both the jobs (through incumbents and supervisors) and the job seekers were interviewed in depth. All interviews were taped and transcribed verbatim.

The interviews when analyzed produced an exhaustive sample of 2,400 human activities or behavioral units required on the jobs; and an even larger group of 3,500 behavioral units from the 150 people interviewed. It was then possible to attempt to develop a set of dimensions common to both pools of behavioral units.

All the behavioral units gleaned from the people interviews were initially grouped according to their relation to one of the three basic orientations common to *all* behavior: Things, People, and Ideas. This triad is as old as Plato and is also used by the U.S.

SAMPLE "DIMENSIONS OF WORK"

T—Things—behavior most immediately and directly oriented toward concrete things.

Examples:

T1. ATHLETIC

Job activities which immediately and directly involve the worker with things such that:

- * * he uses the large muscles of his body in hard physical labor
- * * he pays attention to broad overall results only

(dig ditches, shovel coal, load trucks)

T7. CORRECTION

Job activities which immediately and directly involve the worker with things such that:

- * * he corrects the quality in his own work or in the work of others
- * * he ensures quality performance of machinery and equipment

(set up machinery, repair parts and equipment, inspect work of others or self.)

P—People—worker behavior most immediately and directly oriented toward other people and animals

Example:

P3. MANAGEMENT

Job activities which immediately and directly involve the worker with people such that:

- * * he guides, influences, or directs the present and/or future ongoing behavior of others
- * * he takes or shares responsibility for results of that behavior, including their work
- * * there is high potential for emotional relationships

(train new workers, supervise workers, monitor or guard, hire employees)

I—Ideas & Information—worker behavior most immediately oriented toward ideas, symbols and information.

Example:

I3. CLERICAL

Job activities which immediately and directly involve the worker with ideas and symbols such that:

- * * he records or orders data of any kind
- * * processes paper work intended to do that

(file letters or cards, update stock records, keep records of transactions, etc.)

Department of Labor's *Dictionary of Occupational Titles*. About 60% of the behaviors from both sets of data fell into the Things-oriented category. Some 25% of the people-interview units and 30% of the job-interview units came under the Ideas category. The remaining 15% and 10% respectively, were grouped under People.

(To anyone familiar with the psychological testing done in vocational guidance and industry generally, this distribution is most interesting. Such testing usually is concerned primarily with Ideas, and while it is also concerned with People, very little testing is done in the Things area. This may help explain the low predictive validities of psychological testing in blue collar employment as well as the relatively high validities of such testing for largely clerical and administrative jobs.)

Subcategory definitions implicit in the data were discovered and defined for the behavioral units collected in the people interviews. Then these were used as the base for classifying the units from the job interviews. What resulted was a set of 16 "Dimensions of Work"—the language common to both men and jobs. Eight of the 16 dimensions pertain to Things and four each to People and Ideas (see box at left).

After months of sorting, testing, checking, and statistical scaling, we developed three basic tools—one for use with job applicants, the other two for use with supervisory personnel—based on the 16 Dimensions of Work and containing behavioral units collected from people and jobs.

Developed for job seekers was a Self-Interview Check List, a prepatterned, self-administered interview form. Applicants, unsupervised, go through the form twice in about an hour. First they indicate those units they like best and dislike most (i.e., what motivates them positively and negatively); then they indicate those they have done most and done least. When scored, two highly reliable applicant profiles result: one describing activities preference, the second activities experience, arranged according to the 16 Dimensions of Work.

For supervisors of jobs to be filled, we developed a Job Outline Check List and a Job Card Sort: both are completed in about half an hour with the help of a personnel representative, methods man, or industrial engineer, as appropriate. The check list describes the specific requirements of the job. The card sort describes the job in general or global terms and serves as an internal consistency check on the specific job profile. An accurate profile of job requirements, both positive and negative, results. The profile then can be matched with the profiles of applicants for the job.

Fig. 1 shows the profiles of two different jobs. Fig. 2 (see page 26) shows the experience/preference profiles of successful applicants for these jobs.

The two person profiles in Fig. 2 are each excellent matches for a different one of the two job profiles shown in Fig. 1. They are each classic mismatches for the other job.

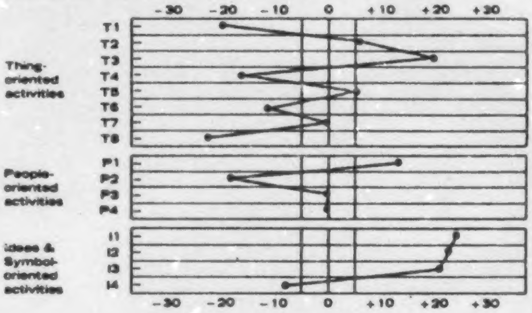
What was learned initially in Indianapolis and subsequently validated in Indianapolis and Brighton was that the closer the person/job match and the higher the preference/experience correlation the better the hire—from the viewpoint of employer and employee alike.

By November 1967, we were ready to test the basic organizing principle underlying these efforts—namely, that *occupationally well-adjusted people who are well-matched to their jobs tend to do a better job for their employers and to stay on their jobs longer.*

These tests were conducted in both Indianapolis and Brighton. In Indianapolis, the participants were 7 employers and 177 of their employees from 23 widely varying white collar and blue collar jobs: bank teller, electronics assembler, sales clerk, buffer machine operator, computer operator, telephone repairman, and others from factory, retail establishment and office. The employees had to have two things in common—relatively long service (9 months to 20 years) and average or better ratings by their managements for on-the-job success.

In Brighton, Honeywell's EDP Division selected 113 people who made up 12 job groups of 7 to 13 individuals each. Four of the groups were regarded by management as unstable, eight groups were considered stable.

JOB PROFILE #1. Receptionist clerk-typist in bank.



JOB PROFILE #2. Electronics assembler, TV manufacturing plant.

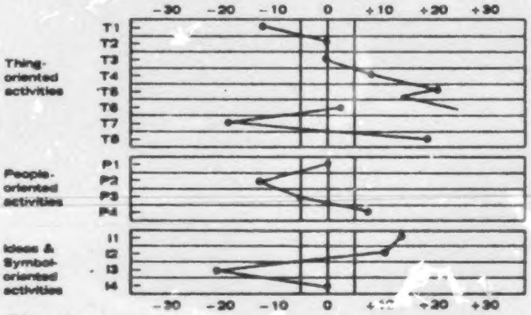


Fig. 1.

Job Outline Check Lists were completed by supervisory personnel for all jobs involved at both locations. Self-Interview Check Lists were completed by all 250 employees, about a third of whom were asked to complete them again one to four weeks later. These lists were administered by briefly trained personnel people, in order to simulate operational conditions.

In both Brighton and Indianapolis, all participating employees also completed a data sheet which included three scaled questions concerning perceived success on the job:

1. How well prepared were you to your job, in comparison with your fellow employees?

2. What are your chances for promotion in comparison etc.?

(Continued on page 26)

3. How good a job do you think you do in comparison etc.?

The experiment was completed over a four-month period. As data came in, the check lists were scored and every response recorded. Statistical analyses were done by computer. The evidence clearly supported the hypotheses that:

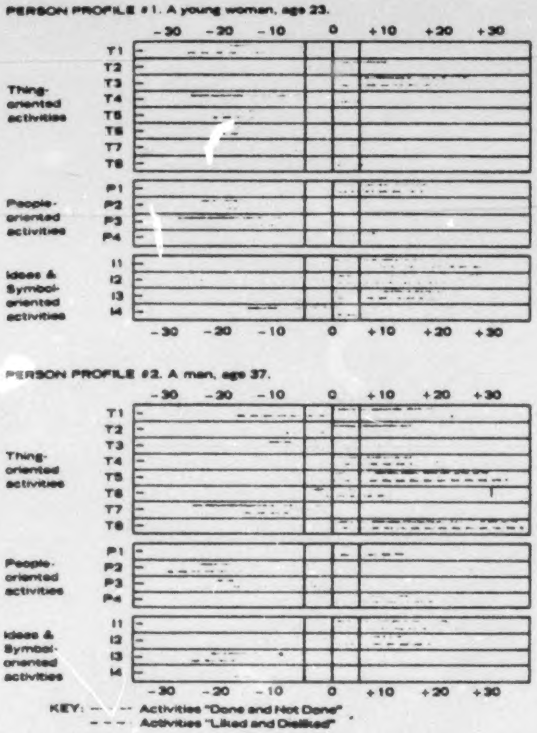


Fig. 2.

1. For long-term employees regarded by their managements as successful on-the-job, there was a consistent and very significant positive correlation between the employee's self-reported activities history and the management-described job requirements.

2. Management had rated each employee's on-the-job success as average or higher; when employee self-rating was similar, self profiles and job profiles matched much more closely than where success ratings disagreed.

3. At Honeywell, where no criteria for successful performance were used to differentiate between workers: zero order person-to-jobs matches in almost every case identified members of "unstable" work groups which had consistent and continuing high employee turnover, while matches in the stable groups were significantly higher.

4. Reliability of the profiles generated by the Self-Interview Check List in the test-retest experiment was exceptionally high, with a median interprofile correlation of +.93 for activities experience and +.88 for activities preference.

Analyses of the Indianapolis and Honeywell results led us in our development of the operational model. For example, we found that employees who considered themselves average or above on the job, and had average or above preference to experience correlations, weighted preference and experience in a systematically different way than those who were below average on both measures. We also discovered that the specific requirements of the job were weighted much more than the values derived from the general description of the job. Our computer systems model takes these factors into account. The system uses the better-matched, better-adjusted, higher-evaluated workers as a model.

Job profiles and applicant profiles are compared by correlation for similarity, and by a difference statistic to control for major differences. The correlation compares the shapes of the profiles and is partially controlled by the real zero center of the profiles. The difference measure compares the extent of divergences between sets of profiles of near-similar shapes. The computer can search a file of hundreds of jobs or of people according to these analytic search strategies in seconds.

Three important facts are provided each time an individual person is matched to a "bank" of profiled jobs by the computer, in real time via time-shared service:

1. A Preference to Experience Index,
2. A Person-to-Job Index, and
3. A Difference Index for each Person-to-Job comparison.

Fig. 3 (see page 27) shows a typical print-out, with these indices noted. In order to be screened into a job the applicant should have each index at or better than a company-determined score. The jobs are printed out in rank-order according to either of the person-to-job indices. As in any referral-placement-selection situation, the efficiency of the system increases with the number of people and the number of jobs with which they are matched. The system will go either way—it will match people profiles against a job file or job profiles against an applicant file.

Typically, a company stores 20 to 30 job categories, those representing its highest turnover, and matches applicant profiles against this file. Obviously it is also less expensive to store the usually smaller number of job profiles than the larger number of applicants. Paper tape storage for relatively inactive files is possible and can be loaded into the computer when necessary. In a placement service such as an employment agency, private or public, it makes sense to store the profiles of active job-seekers, matching employer requests (in the form of job profiles) against this people register, removing the person's profile when he has been successfully placed.

...correlations with four to five times the predictive power of the "normal" psychological test battery...

What have been our validating experiences? The experimental validation study done in Indianapolis and Brighton developed average people-to-job correlations with four to five times the predictive power of the "normal" psychological test battery validations with similar work groups. We have followed up some of the Indianapolis subject-groups two-and-a-half years after original data collection. In a bank, an insurance company, and telephone company (a total of about 85 employees) we found that higher-matched employees had from 150% to 250% more months with their companies than did those who had below average matches. In a one-year study at a large supermarket chain, where we studied 30 "standard" long term successful employees and 35 "hard-core" employees, we found much the same thing. Among their standard employees, those with above average matches were with the company four to five times longer than those with below average matches. In the "hard-core" group, six-months turnover was 78% for below-average matches, 44% for above-average matches. In Charlotte, N.C., where the Cleff Job Matching System (CJMS) is being used to place largely semiliterate black farm-hands in traditionally white industry, with a very small job bank, the hire to referral rate is about 75%—with retention at about 70% after 90 days. The system has recently begun to refer ghetto dwellers in Newark, through the Business & Industrial Coordinating Council, into a job register of only 50 job categories representing some 200-250 openings.

```
JANE DOE
147-18-4906
JOB APPL'CANT
EXPERIENCE PROFILE
 -8  0  0 -4 -8  4 -8-13 12 12  1 -1  2  3  2  4
PREFERENCE PROFILE
-13-13  6  0 -7 -3 -4 -7 10 10  4  1  3  7  4  5
COMBINED PROFILE
-10 -6  3 -2 -7  1 -6-10 12 11  3  0  3  6  3  5

SUITABILITY OF PREF. TO EXPR. IS 0.7467

  8 PROFILES ABOVE MINIMUM
HOW MANY DO YOU WANT TO SEE?  5

SUITABILITY INDEX IS 0.7062
DIFFERENCE INDEX IS    782.
OPERATOR
ABC COMPANY
JOB PROFILE
-11 -9 10 -2 -5 -8 -3-15 17  2  2  5 22  0 11  1

SUITABILITY INDEX IS 0.6390
DIFFERENCE INDEX IS    991.
COUNTER CLERK
ABC COMPANY
JOB PROFILE
-17 -1  -2-16 -3 -2 -6-15 13 -3  2 10 15 12 14 -1

SUITABILITY INDEX IS 0.4183
DIFFERENCE INDEX IS   1402.
SUMMARY CLERK
ABC COMPANY
JOB PROFILE
-11  4 10 -8 -3 -2 10-16  6 -8  0  1 13 15 20  4

SUITABILITY INDEX IS 0.3213
DIFFERENCE INDEX IS   1480.
AUTOMAT'C OPERATOR
ABC COMPANY
JOB PROFILE
-16 -1 12-12  2 -2 10-13  5-12  0  3 16  5 12  0

SUITABILITY INDEX IS 0.1372
DIFFERENCE INDEX IS   1773.
TECHNICIAN
ABC COMPANY
JOB PROFILE
-12 -4 14 -8 -1  7 19 -5 -3-12  0  1 12 10  7  7
```

Fig. 3.

The pressing need for a workable and holistic, but analytical, job matching system has been demonstrated over and over again by the many fascinating applications which others have suggested. We are now experimenting with some of these suggestions. For example, in cooperation with New Jersey Rehabilitation Commission, we are using CJMS for some of its clients. We developed a procedure for analyzing a client's physical and emotional capacities and incapacities using the same 16 Dimensions of Work. This provides a vocationally functional profile of the rehabilitation client. A job register containing some 250 job profiles, developed for New Jersey Employment Service, provides a large sample of jobs against which the set of person-profiles are compared. Both client and counselor then have a set of real jobs to which a client may be referred or which can serve as a realistic basis for planning vocational rehabilitation.

Working with a county vocational school system we are planning to use the system to profile industry examples of trades for which students are trained. This sample can be compared to the profiles of the courses themselves for guidance in adjusting them to industry's requirements. And, of course, student guidance and placement is an obvious spin-off.

Management people we've spoken to have asked us to use the system for comparing jobs and building job heirarchies and development ladders. Others have suggested using it to select cadres for new production lines or as an industrial engineering tool for constructing jobs which match the present work-force. The list of suggestions goes on and on. Our response is simple: we *believe* that the system can help do those things, but we do not *know* if it can. CJMS is certainly no panacea for all of our human resources problems, but the available evidence suggests that it is worthwhile to test it in these roles. ■

Dr. Cleff is vice president of research and development of ADP Personnel Data Systems, Inc. Previously, he worked at the Center for Independent Action where he conceived, researched, and developed the operational man/job matching system. He received his doctoral degree from the Univ. of Pennsylvania.

Mr. Hecht is vice president of marketing of ADP Personnel Data Systems, Inc. He is a former faculty member of the City College of New York and Bronx Community College, where he was also coordinator of institutional studies. A member of the American Psychological Assoc., he is coauthor of the booklet "Interviewing Techniques for the Non-Personnel Executive."

APPENDIX B

Paper written by Dr. Samuel H. Cleff describing development and initial validation of the Cleff Job Matching System.

"Project Indianapolis: Patterns of Competence"

PROJECT INDIANAPOLIS

PATTERNS OF COMPETENCE

By: Samuel H. Cleff, Ph. D.

Introduction:

In the spring of 1966, the author was asked to propose a research and development effort to the Center for Independent Action and the National Association of Manufacturers for a job-person matching system. As with a parallel effort, the system was to be capable of computerization; but should represent some obviously different and hopefully innovative approaches.

At that time, the author was an employee of General Electric Co.'s Missile and Space Division as a sort of psychological-management-consultant-in captivity. The report which follows describes the results of the research and early development effort.

An approach was outlined and discussed with representatives of the C.F.I.A. and the N.A.M., who were very enthusiastic about it. A proposal was written and accepted, and the research process was begun. At this writing two research and development phases have been completed; and the author is now deeply involved in the first wide-scale field applications of the system with the State of New Jersey, The North Carolina Manpower Development Corporation and with several large private companies.

The two experimental phases described here were completely supported by private funds as part of the effort by the Center for Independent Action to demonstrate that it is not only possible but necessary for the "private sector" to develop creative alternatives to government action on social problems. For their faith in the potentials of the "way out" approach described here, as demonstrated by both their financial contributions and their emotional support, the author is indebted to the following organizations:

Lilly Foundation

Stern Family Fund

National Association of Mfrs.

Indianapolis Chamber of Commerce

The reporting of the process and findings of the initial two R & D phases presents a problem. "Project Indianapolis" has been a demonstration of some new theoretical and methodological approaches for academic psychology, as well as the development of some new tools for use in management, vocational guidance, and job placement. The report can be written from any of these points of view, but because our highest priority concern has been with its applicability to what is now called "Urban Problems" (we used to call it 'race problems') we have elected to write the report for those most likely to use the system. A separate piece will be written for the psychological community, which is most likely to study it, experiment with it, criticize it, and eventually do research which will improve on what is described here. Of this we are certain, both the research approach and the system it generated for immediate application can be improved upon, and will be.

S. H. Cleff Ph.D.
Vice President
Adaptive Systems, Inc.

PROJECT INDIANAPOLIS - Developing a Job-to-Person Matching Model Research and development objectives: To investigate an analytical approach and develop the basic methodology for the "matching" of people in the semi/low-skilled work force with potentially available job/training situations. To validate the concepts and methods developed, and to begin the development of a mechanizable operation model for matching people and jobs at the semi-skill and low-skill levels.

Research rationale and background:

In considering the approach we wanted to take, we began by reviewing the general practices in the field of job-matching; both from the point of view of the worker looking for a job and of the employer seeking workers. We found the area cluttered with many ideas and practices which date back to ancient Egypt and the Roman Empire; and most severely influenced by the labor-job market of the Great Depression of the 1930's when jobs were relatively scarce and labor relatively plentiful. Since World War II there has been a reversal of this labor-to-jobs relationship, with government policies heavily committed to maintaining a relatively "tight" labor market. With many jobs going begging, however, there still remains a sort of irreducible minimum of "hard-core" unemployed; minority group members are represented in that minimum at about twice their proportions in the general population. We also found that employers were seeking people with "skills" needed to do jobs which demanded little skill, largely because they did not want to make the small investment in training. Yet labor turnover in this group is extremely high and expensive.

From a scientific point of view, we found few realistic attempts to build organizing concepts which would treat the entire field in a systematic way and which would generate systematic and experimentally testable solutions to the problems of human resources management - for the benefit of management as well as of individual workers. The entire field is so disorganized and primitive that we felt we had to start from scratch to develop our research approach and logic.

We began by accepting a psychological logic which appears to be implicit in almost all job-to-person matching practices over the centuries, that is: In general people tryo to seek out those situations or activities in which they perceive the greatest likelihood for success and try to avoid those situations or activities which they perceive as having the greatest potential for failure. Employers try to discover the patterns of success/failure for a job applicant, using many techniques, but principally the unsystematic biographical interview, in order to "match" the experience patterns of applicants to the requirements of a job. Job search and evaluation by workers is even less systematic and consists mostly of trial and error exploration.

Though the above logic is implicit in almost all attempts to match jobs and people, there have been notably few efforts to systematize the process. Despite the obvious facts that there are no jobs without people, a suitable "language" or set of variables based on human activities which is common to both jobs and workers has not been developed. It seemed to us that this would be an eminently fruitful task in our own research and development efforts. It was encouraging to note that "weighted application blanks" and "autobiographical inventories" have been consistently useful in predicting job success in a number of different occupations.

In less complex times it was possible for a person seeking employment to have fairly accurate knowledge about the activities content of most jobs in his immediate environment. In choosing an occupational line or a job, he had good evidence to support his choice and increase the probability of his success. The same kind of knowledge was available to employers so that they could fairly accurately decide about the relevance of an applicant's experience to available jobs. As complexity and specialization increased, the number of "jobs" also increased. We have reached the point at which the U.S.E.S. Dictionary of Occupational Titles lists some 42,500 jobs. It has been estimated that by the year 1980 some 30% of all the jobs listed in the D.O.T. will have been developed in the intervening twelve years because of new and changing technologies. At the same time, a similarly significant proportion of jobs will disappear.

Should we develop new kinds of people to do these new jobs and declare those new employed in dying jobs obsolescent as people? The logic of present employment practises implies this. We prefer to declare the logic of present practises obsolete and find or invent a new and viable logic for designing jobs and describing suitable workers. In a very real sense present employment practises logic assumes that a worker experienced in a particular job classification is capable of performing in that job classification only. What shall we do with all the bank tellers who will be replaced by the automated systems now being installed and tested? Can we declare all bank tellers obsolete and put them on welfare? Present methods represent a static logic trying to operate in a dynamic environment. Our view is that job titles are largely social labels which tell us very little about the activities content of a job, but which do describe its status and other social qualities. Job titles are certainly not nearly as useful in describing content as they were when the economy was far less complex and dynamic.

In order to know what a person actually did in a previously held job, an employer must find out what activities the worker performed while holding a job - every experienced and well-trained employment interviewer knows that.

It is apparent to us that certainty about the duties or activities performed in an occupational classification increases as a function of the amount of training, education, and experience necessary in that occupation. A person who describes himself as a corporation legal counsel for a large corporation has given a great deal of information about his probable job activities. On the other hand, a person who describes himself as a "busboy" has told us very little, except of his organizational social status, because his specific duties are more highly dependent on the particular restaurants where he has been working. What does a "fireman" do on a diesel locomotive?

We have tentatively decided that there are five relatively homogeneous occupational levels, which are discriminated partially on the basis of the extent of training necessary to perform at average standards within them, and partially on the basis of social responsibility. These are: 1. Low/semi-skilled, where on-the-job training is less than 120 days; 2. Skilled, where four months to three years of training is required; 3. Professional, where three to ten years preparation is necessary; 4. Management, defined by organizational responsibility for the efforts of others; and 5. Innovative, which is defined by causing technical changes in the other four classifications. We believe that the dimensions for describing patterns within each of these five classes will be relatively homogeneous but significantly different between classes. Project Indianapolis focused only on the first occupational level because of the immediate need in our society and because this level probably accounts for about 65% - 75% of all the jobs in the economy of the U.S.

Therefore, in formulating the research and development approach we worked on the basis of the following assumptions:

1. There is no scientifically established system presently available in the field of matching people and jobs; instead present practises are a conglomeration of superstition, tradition, intuition, and splintered scientific efforts.

2. Since jobs require people, it is both feasible and necessary to develop a set of variables, or dimensions, common to jobs and people which can be used to compare the two; as well as to compare people with each other and jobs with each other.

3. In general, human beings tend to seek out and continue those activities in which they believe they will be more successful and to avoid those activities in which they believe they will be less successful, that is there is a positive competence motive.

4. Jobs and people at the semi-/low-skill level share relatively homogeneous dimensions along which their individual competency activities patterns may be described reliably.

5. There are dimensions of social/emotional motivation which develop out of the interaction of competence motives and environmental opportunities which account for a significant portion of variance in the matching process.

Research and Development Plan:

As suggested above, we decided that our first step should be the development of a language with which both jobs and people could be described. In order to do this we decided to use the methods of systems analysis; to study a sample of jobs and a sample of poeple who might be considered for those jobs, and who in turn, might consider those jobs. By collecting an exhaustive sample of human activities from both jobs and people, we could begin with either set of data and develop a reliable classification scheme, then test its validity by seeing if the same classifications could reliably account for the kinds of activities in the other. Once we had done that, we could then develop analytical measuring instruments based on the "language" we had developed. These instruments could then be applied to samples of workers and their jobs, with certain known or measurable characteristics, to test the basic assumption of general congruity between workers and the jobs they keep, as well as certain corollaries to this basic proposition. If this basic congruity concept held up, and the hypotheses generated by this concept were validated, then we would be on conceptually safe ground for pursuing the development of an operational systems model based on those concepts.

We also decided that prediction in both directions was necessary for the building of a successful operational model. That is, a good "match" between person and job should predict both good employee performance from the point of view of management and job satisfaction from the point of view of the worker. Philosophically, a good "hire" for a job is a good "placement" for the worker.

On the assumption that so-called "chronically unemployed" individuals are representative of the semi/low-skilled employee group from the point of view of the dimensions of their activities, though probably different in the patterns described along these dimensions, we decided to use as our human sample a group of about 150 chronically unemployed people from Indianapolis. It is generally agreed that their chronic unemployment is a function of social and emotional variables as well as of variables related to their competence or skill potential. Our sample of jobs came from the same Indianapolis labor-job market.

PROJECT INDIANAPOLIS

Phase I - Basic Research and System Development

Method

A. Samples

I. Persons

For the purpose of this study, "chronically unemployed person" is defined as one who, though physically capable, has been unemployed at least as much as he has been employed over the preceding five-year period; or was predominantly unemployed from age twenty-one if the subject was less than twenty-six at the time of the study (summer, 1966). The subject must also have been available for work during the period used to determine his employment status; thus housewives, ex-inmates of institutions and students were considered "employed" if they were engaged in those activities and not seeking full-time employment elsewhere.

So that age would not be the predominant factor in determining employment, the sample was limited to persons between age twenty-one and forty-five, inclusive. Further exclusions from the sample were 1) physically handicapped persons, 2) so-called "underemployed" persons in jobs not consistent with skills and abilities unless they met the basic criteria, 3) frequent job-changers, unless employment history met basic criteria. Though the proportion of whites in the chronically unemployed group was double that of non-whites, within the non-white population the rate of unemployment was twice as great as in the white population of Indianapolis. Our people sample, therefore, includes twice as many Negroes as whites. (See Table 1. for some other characteristics of this group.)

RACE - SEX EDUCATION	NEGRO MALE	NEGRO FEMALE	WHITE MALE	WHITE FEMALE	
[illegible]-- 4	1	1	2		
5 - 8	4	6	11	2	
9 - 11	23	24	7		
12 - UP	19	23	19	2	
	47	54	39	4	144

RACE - SEX Age					
21 - 25	15	12	4	1	
26 - 30	9	10	5	1	
31 - 35	6	4	6	2	
36 - 40	7	13	4		
41 - 45	10	15	20		
	47	54	39	4	144

TABLE I. SOME DEMOGRAPHIC CHARACTERISTICS OF THE PEOPLE - INTERVIEW SAMPLE, PROJECT INDIANAPOLIS

II. Job Sample

A sample of 57 jobs was selected for "interview" and analysis. The cooperating companies said that these were all jobs for which they would seriously consider hiring chronically unemployed people. In general these are considered entry-level semi-to low-skilled jobs.

JOB-INTERVIEW SAMPLE

1. Pumping Station Helper (see 15)
2. Trim Line Base Tester
3. Machine Clerk
4. Gas Station Manager
5. Radio Assembler
6. Granulation Operator (see 14)
** 7. Keypunch Operator
** 8. Lab Technician
9. Produce Manager
10. Meat Cutter
11. Dairy Department Head
12. Clerk-Typist
13. Baker's Helper
14. Granulation Operator (see 6
15. Pumping Station Helper (see 1)
16. Weight Master
17. Core Maker
18. Oil Filler
19. Chain Assembler
20. Electronic Instrument Assembler
21. Chemical Operator
22. Security Guard
23. Switchboard Operator
24. Metal Squeezer
25. Mechanic's Helper - Electronics
26. Contact Point Assembler
27. File Clerk
28. Automatic Popping Machine Operator
29. Military Pay Clerk
30. Mixer
31. Appliance Installation Helper
32. Capsulation Helper
**33. Punch Press Operator
**34. Lab Technician
35 Application Investigation Clerk
36. Shipping Clerk and Bottle Filler
37. Chief Clerk - Check-O-Matic Section
38. Meter Cleaner
39. Final Inspector
40. Marker Checker
41. Ice Cream Route Salesman
42. Lead Man - Set Up Desmonds
43. Cable Assembler
44. Lead Man - Milling Machine
45. Bank Teller
46. Manager Trainee - Burger Shop
47. Refrigeration Repairman
**48. Punch Press Operator
**49. Keypunch Operator
50. Telephone Operator
**51. Filtration Plant Operator
**52. Filtration Plant Operator
**53. Capsule Filler
54. Pipe Fitter
55. Lead Man - Diamond Setting Operation
**56. Keypunch Operator
**57. Capsulte Filling Operator

** Duplication

1. After the usual "participation" conferences in New York, Philadelphia, and in Indianapolis with local industrial personnel people, the first step was to get a local statistician familiar with Indianapolis to lay out the people and job samples as described. Then a group of social workers from Flanner House were selected and trained to do the people interviews. (See the following page for the interview outline.) It was interesting to note how difficult these very conscientious and helpful people found it to learn an interviewing approach which did not ask for feelings, attitudes, interests, motives, and family relationships. We went through a morning of group training and explanation, then an afternoon of role-playing with tape-recorders as very usefuly training devices. A representative of the contractor remained in Indianapolis to integrate and oversee the gathering of the interviews.

2. There were 150 people-interviews completed and taped, six of which were impossible to transcribe from the tapes. The outline for "people-interviews" is on page 11.

why?

3. Using the outline shown on page 12, fifty-seven jobs were interviewed through questioning both a worker and a supervisor for each job. All interviews were taped. One interview was unacceptable.

OUTLINE FOR PEOPLE-INTERVIEW

I. Introduction

"I am ___________ ______________, from ________, _____________, and am part of a research team trying to help people get into jobs they can do best. So I need your help to find out what you do best, and would want to do if you had a chance."

II. Establish Rapport (5-15 minutes)

Use professional freedom; the guideline may be -- Do you feel comfortable?

III. Question 1.

"Suppose you begin by telling me about all the jobs you have had. Start with the first job you ever had -- even if it was while you were a kid in school -- and work up to the present time."

"I am particularly interested in those things you did better than others on each job. Now, what did you do on your first job?"

(For the first three or four minutes try not to interfere with what they say. If they don't give you necessary information, go back and repeat - "Can you tell me more about what you did on that job?" Asking when and where they worked adds structure and reinforces.)

After they've concluded the job part, thank them by saying. "Thank you. That covers the work experience very well."

IV. Question 2.

"Now tell me about your education. What did you do in school? Start with grade school and work up. What did you do better than other things?"

(Again thank them when they've finished.)

V. Question 3.

What do you do in your free time? What do you do better than other things in your free time?"

(Here the person can easily fall into feelings -- turn it off by getting back to concrete question -- What did you do -- how do you do it?)

OUTLINE FOR JOB INTERVIEW

I. Introduction

"I am ____________ ______________, working on a Chamber of Commerce research project trying to help describe jobs in a better way so that people can be placed more successfully."

II. Question 1.

a) To worker -- "Tell me what it is you do on this job starting the first thing Monday morning. Begin with the very first thing you do when you enter the plant.

I am particularly interested in the activities which you do that make you more competent than others."

b) To foreman -- "Think of the most competent man you have and tell me what he does on this job starting first thing Monday morning. Begin with the very first thing he does when he enters the plant.

"I am particularly interested in the activities which he does which make him more competent than others."

III. Question 2.

"What were the things you (he) did in learning how to do this job well? Go back as far as you want in the training and education necessary."

IV. Question 3.

"What is it you do (he does) on this job to make it more enjoyable?"
(This leads to question 4)

V. Question 4.

"On what kind of things are you (is he) free to use your (his) own judgment."

(If answered in question 3, don't ask 4).

4. All interview tapes were transcribed and typed. Content analysis, seeking "behavioral units," were then done on all person-interviews. Content analyses were done according to the instructions below.

CONTENT ANALYSIS INSTRUCTIONS

1. Isolate behavioral units.

   a. A set of words which describe a unique and meaninful activity. Not a job name or course name (not "dishwasher" or "math.")

   b. A behavior that has some objective. (Not accidental behavior such as winking, scratching or kicking knees.)

II. Must be a complete message. At least a verb and an object. (Do I have an image of what this activity looks like or does? Have I communicated the message?)

III. Must be distinct.

IV. First, underline anything that could be a behavioral unit. Then go back and condense on words of the subject and use best way to describe activity.

V. Three people should analyze each interview. In case of differences, two out of three must agree. Anything that cannot be described should be put aside for Dr. Cleff. (Don't use unique name for part of machine on job, use generic term to describe the part.)

5. All of the behavioral units analyzed out were typed on to address labels for manual sorting by the author. The 3500 units gathered from people-interviews were kept separated from the 2400 units collected from job-interviews.

6. After reviewing the behavioral units, and after long and involved, sometimes heated, discussions with two mathematical statisticians, we concluded that the data to this point could not be subjected feasibly to any known statistical treatment. We had wanted to use either a paired comparisons technique or factor analysis for developing the pattern dimensions. The first would have demanded the pairing of several thousand items, each with the other, by several subjects; for factor analysis the feasibility problem was similar. The paired comparisons would probably have been the better treatment, followed by cluster analysis of groupings resulting from it, but because of the great time involved and the pressure to complete the study, it was decided to go another way.

7. The author personally sorted every behavioral unit according to a set of general principles. (See sorting principles p.15). He then defined and described each of the categories which was "discovered" by this sorting and asked two other people to classify a sample of 25% of the items he had already sorted. Reliability for the three individuals was quite good. There was over 80% agreement among the three sorters for items which were like the author's sorting, and less than 20% agreement on category for those sorted differently than the original.

Principles for Sorting Behavioral Units Gathered from Person - Interview into Categories and Sub-Categories

a. Begin with a simple set of general categories, preferably classical and philosophical in origins.

b. Sort a large random sample of behavioral units into these major philosophical categories. While sorting, generate hypotheses for sorting into functional sub-categories.

c. Test these hypotheses within each major category by trying to sort into hypothesized sub-categories. Generate new hypotheses where it seems necessary.

d. After having sorted all of the first random sample within each of major categories and sub-categories, write preliminary definitions of the hypothesized sub-categories.

e. Sort the remainer of the behavioral units into the appropriate sub-categories, keeping aside those that do not "fit" in any.

f. Generate new sub-category hypotheses on the basis of those kept aside in Step 5, and/or revise definitions of some where it seems necessary.

g. Rewrite definitions of all sub-categories to conform to the latest usable hypotheses which fit 98% of behavioral units collected.

h. Ask two or three other judges to sort a large random sample of units already sorted and noted, to check reliability of definitions and items sorted.

An introduction to and the definitions themselves of the classification system appears on pages 16 -19:

INTRODUCTION TO CATEGORY DEFINITIONS

The classification system of human coping behavior described here, with special reference to a sample of chronically unemployed people in Indianapolis, is based on a major categorization of man's activities orientations into (1) Things, (2) Ideas, and (3) People. This is a classical approach. The breakdown within each of these major classes into meaninful sub-categories necessarily followed the activities collected from our sample population in Indianapolis.

Within the People category, what emerged was almost a restatement of the central thesis of things, people, and ideas in terms of the distance, involvement, or responsibility involved. Within the Things category a similar pattern has emerged which goes from the very concrete to the higher levels of abstraction, with the tool and machine intervening between the do-er and the thing. Within the Ideas category, the relative concrete abstract nature of the symols the do-er deals with fell out in the sorting of the activities.

DEFINITIONS OF 16 SUB-CATEGORIES

Category T	for activities which directly involve things, or tools to work on things.
T1	Athletic - Activities which make use of the large muscles of the body, with high physical exertion and relatively large expenditure of energy, or use tools which require the same. Such as dig ditches, mix concrete, laod trucks, play football, put the shot, etc.
T2	Utility - Helping or peripheral activities which do not involve either the skillfull use of tools or muscles and whose objective is to save the time or energy of someone else. Such as delivering papers, running errands, handing tools, stocking bins, etc.
T3	Fine Manual - Activities which involve relatively low immediate expenditure of energy, but requiring attention to detail because of the smallness of the things worked on or with. May work with hands or tools, or light machinery. Such things as soldering wires, assembling electronic parts, making small things, sewing, knitting.
T4	Gross Manual - Independent - Activities which involve low to average amount of energy expenditure, but requiring only broad attention to the operation because of the grossness of the task or the product. Work is done in relative independence from close supervision. Such activities as laying bricks, painting houses, building construction forms, framing houses.
T5	Gross Manual - Dependent - To engage in activities which involve low to average energy expenditure rate, broad attention to operations, use machinery or tend machinery in assembly line or under systematic close supervision by instruction or by foreman; i.e., grind metal parts, operate dishwasher, feed conveyer, etc.

T6 Order - Activities whose central function is maintaining or improving environmental order where one is working or where others are working or things that are used at work. Such activities as housekeeping, tidying, sweeping, setting tables, washing clothes, etc.

T7 Correction - Activities with the objective of correcting or maintaining quality in the work of others or self. Such activities as repair parts, inspect, set up machinery, checking.

T8 Locomotion - Activities which involve driving or riding in mechanical vehicles, or operating equipment mounted on them. Such as drive fork-lift, drive truck, drive tractor, ride bicycle.

Category P for activities directly involving people (or domesticated animals)

P1 Attendance - Activity, relatively cursory and impersonal, which meets the immediate wants or needs of another person, but which does not involve deep social interaction or personal bodily contact; i.e., wait on customers, wait on tables, take orders for goods or services, etc.

P2 Service - Activity which implies a relatively intimate or personal relationship with the person or persons whose wants or needs are being served; i.e., cut hair, tend patients, bathe children, etc.

P3 Management - Activity which implies taking responsibility for influencing the present and/or future behavior of other people; i.e., teach, supervise, hire, plan social doings, etc.

P4 Argument - Activity with the objective of convincing another person to act in a way beneficial to/or in concert with the do-er; i.e., sell, buy, trade, campaign, preach, etc.

Category I for activities concerned directly with ideas; or symbols of ideas, people, or things

I 1 Verbal - Activities in which verbally stated ideas are central, or where problems are stated and solved in verbal terms; i.e., read instructions, take shorthand, fill out reports, memorize facts, etc.

I 2 Numerical - Activities in which numerically stated ideas are central, or where problems are stated and solved in numerical terms; i.e., read compass, read gauge, measure floor, survey land, count, etc.

I 3 Clerical - Activities aimed at recording or keeping track of events, or completing procedural paper work for administrative purposes; i.e., order stock, process loan, keep records, sort or file.

I 4 Artistic - Creative - Activities in which the individual must use artistic talents at some level, or must be novel or creative in his approach, i.e., write copy, draw, draft sketches, arrange window displays, etc.

8. After having completed the sorting and classification, and written sub-category definitions for the behavioral units collected from the people-interviews, the author used these definitions as the base for sorting and classifying the units gathered in the job - interviews. See page 20 for the sorting principles used for job data - and for the definitions of four new sub-categories found necessary. About 90% of job units fell into the 16 sub-categories developed for people data. The remaining 10% fell into the added four classes. Note the highly plant - or company - specific nature of these sub-categories.

PRINCIPLES FOR SORTING BEHAVIORAL UNITS GATHERED FROM JOB-INTERVIEWS

a. Begin with the set of categories and sub-categories as "discovered" for the units gathered from the person interviews

b. Put aside units which cannot be sorted reliably into those categories.

c. Hypothesize and check out new sub-categories as necessary.

d. If no items are found to fall into a person interview sub-category, reject that sub-category for jobs.

e. Write and re-write definitions as needed.

f. Ask two or three judges to sort a large random sample of units already sorted and noted, to check reliability of definitions and sortings.

DEFINITIONS OF FOUR ADDITIONAL SUB-CATEGORIES BASED ON JOB DATA

T 9 Adjustment - Activities which help equipment adapt to a particular or specific set of operations.

T 10 Materials & Tools - Activities involved in selecting, obtaining, and preparing materials and special tools in order to perform other operations.

P 5 Communicate - Activities whose principal purpose is the transmission, person-to-person, of job-relevant information to colleagues, superiors, or subordinates.

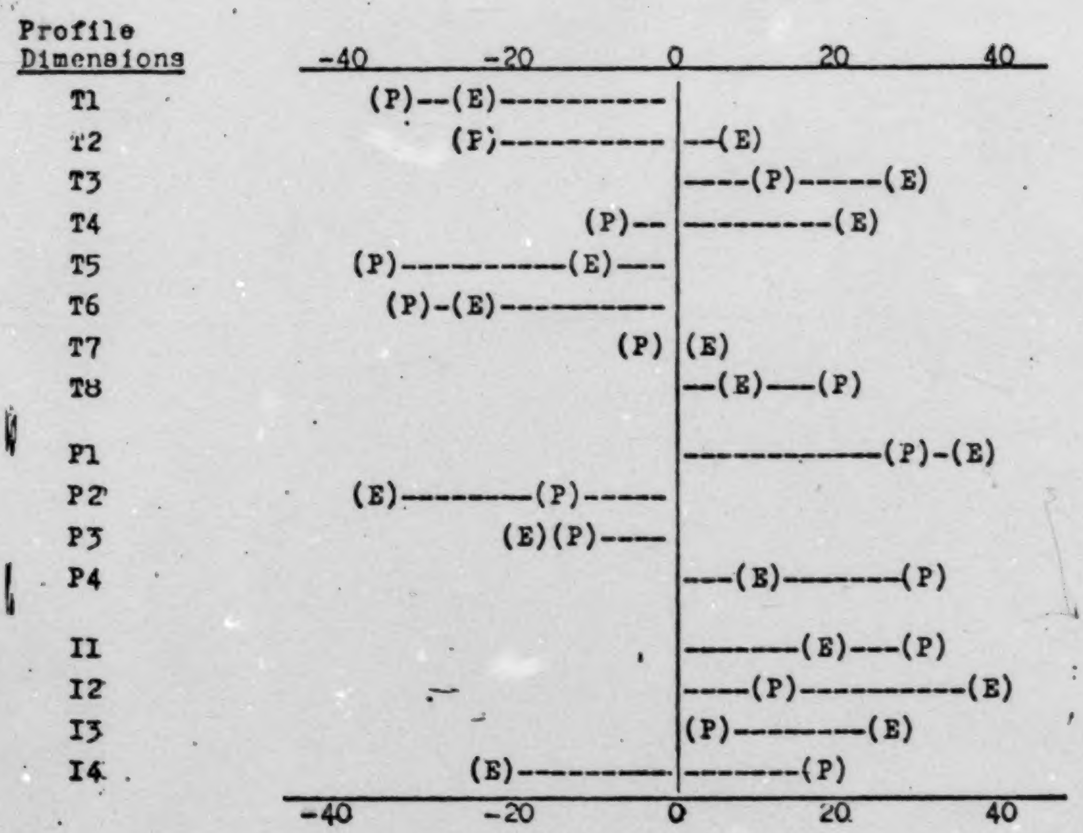
15 Technical - Activities based on a background of technical experience or education in the sciences and technologies.

9. On the basis of the set of sixteen sub-categories common to both people and job interviews, a first approximation of an instrument called "Interview Check List - Persons" was constructed. It was designed to measure the relative tendencies of a person to approach or avoid activities classified according to the sixteen sub-categories. When scored it provided a profile which represented the pattern of the individual's reported activities preferences and experiences.

This instrument had a multiple forced choice format, in which the respondent is asked to indicate his activities experiences and preferences for twenty test groups. Each test group consisted of sixteen behavioral units, one from each of the sixteen sub-categories. Preference and experience reports were gotten in order to help the subject differentiate between what he has and has not done, and what he likes and dislikes. When more clearly differentiated these can be mathematically combined with each other to improve predictive capacity. Within each test group a "forced normal distribution" was used to provide differential scoring weights. It was expected that empirical test would determine the weighting system, though an arbitrary system was used at first.

It was decided that the profie would have a "real" zero point inasmuch as items selected as preferred or done would get positive weighting and those selected as disliked and least done would get negative weights. The preference and experience profiles for a girl who worked as a receptionist clerk-typist is shown in Figure 1.

Mary Jones-Smyth



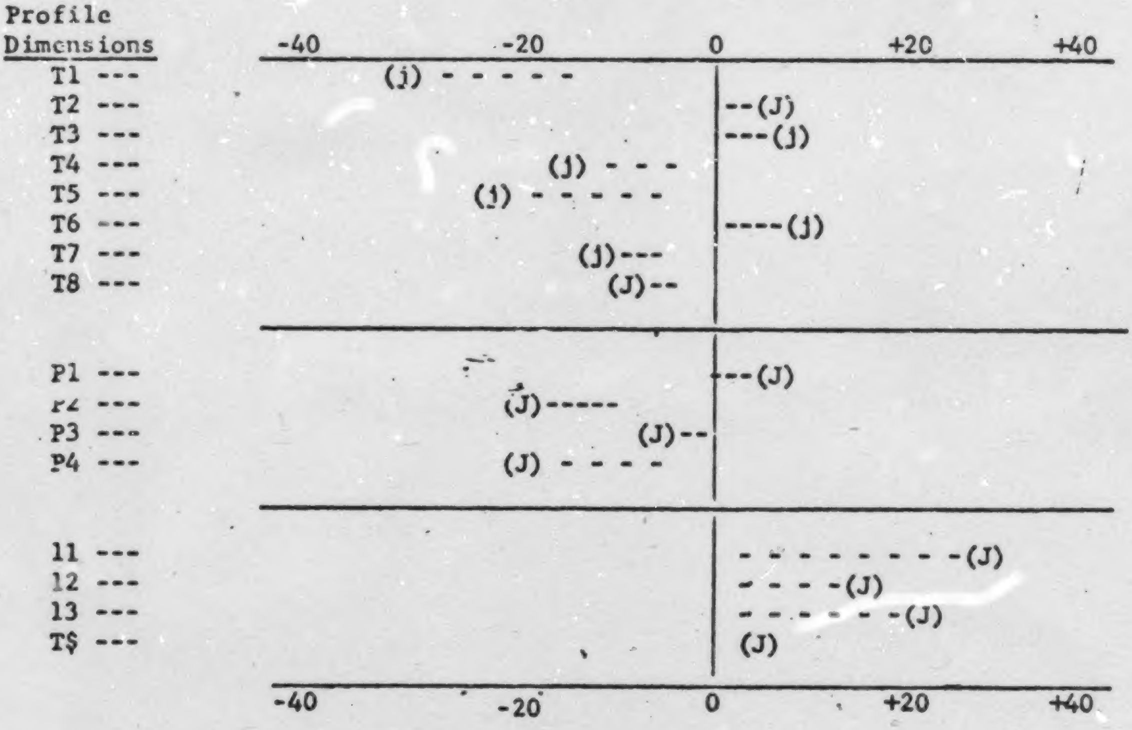
(P)= sum of likes and dislikes raw scores

(E)= sum of done and not done raw scores

Figure 1. Profiles of indicated lkes and dislikes, and activities indicated as done and not done. Obtained from the so scoring of an Interview Check List - Persons.

10. We wanted to construct a job descriptive instrument similar in structure to the Interview Check List - Persons, but we found this to be difficult because of what appeared to be the relative lack of generalizability in the units collected in the job interviews. So we tentatively designed a card sort questionnaire which made direct use of the dimension definitions. We were dissatisfied with this instrument, however, and decided ourselves to improve it early in Phase II of the project.

Figure 2, is a sample job profile generated by the job descriptive instruments developed in Phase II.



J. = Non-weighted sum of dimension scores.

Figure 2. Job description profile generated from scores on Job Outline Check List.

C. General Findings:

Though Phase I of this study had exploratory objectives with an applied end in view, there are some interesting data which bear on the general theoretical approach as well as on present practises in the selection, guidance, and selection areas.

1. Of the approximately 3500 behavioral units garnered from the people-interviews, about 60% fell into the Things category, about 25% in the Ideas category, and about 15% in the People classification.

2. Of the approximately 2500 behavioral units from the job-interviews, about 60% fell into Things, about 35% into Ideas, and the remaining 5% into People. Within the Ideas classification only a very few units (6) fell into the Artistic - Creative sub-category.

3. In sorting the units taken from the job interviews, it was necessary to create four sub-categories which had not appeared in the analysis of the units from the people-interviews. Specifically these were called Machine Adjustment, Materials and Tools, Technical, and Communicate. Definitions of these sub-categories are included in the preceding descriptions of the classification system generated for job-interview units.

D. Discussion of General Findings:

Most psychological testing now done in vocational guidance and in industry generally is concerned with our Ideas category, with a fair amount concerned with the People classification. Very little testing is done in the Things area. With the activities of our sample of people and jobs so heavily things-oriented it would appear that testing is being done in the wrong end of the spectrum of activities. This may help to explain the very low predictive validities of psychological testing in industry generally, as well as the relatively high validities of such testing for largely clerical and administrative jobs, and for situations with a heavy loading in ideas and symbols such as aircraft pilot training and college performance.

When we question the specific differences between the two activities classification systems developed here, two possible explanations come to mind. First, the four extra sub-categories developed for the job-descriptive system are highly plant or company-specific and represent those areas which get the most attention from an employer in early training of a new employee. Second, it is possible that failure to discuss such activities by the chronically unemployed people we interviewed helps to explain why they are chronically unemployed. That is, since they pay less attention to these kinds of activities as important, they lose their jobs. Most probably the truth lies in some interaction between the two possible explanations, and suggests the need for special attention to these four areas when people like our sample are hired by industry.

F. Discussion of Specific Findings:

Since the construction of the two classifying systems is largely the work of one person, the author, there is certainly an opportunity for bias. The author would have been quite disappointed if he had found it impossible to construct two descriptive systems which were not largely congruent. Yet we felt quite comfortable with the possibilities for experimentation and eventual application to the matching of jobs and people which are inherent in the system. There is certainly room for change and improvement. For example: though we have sketched out a system for the description of the activities conent-orientation of individuals and jobs, we have not studied other probably important orientations such as complexity and status. We believe that content-orientation is basic, and that complexity, status, and other factors may be viewed as weightings to the content-orientation of the individual and to the content-demands of the job requirements.

As for the measuring instruments, we recognized that much remained to be done before they could become scientifically or operationally useful. It is to that end that Phase II of Project Indianapolis was planned and implemented.

F. Summary and Conclusions, Phase I:

Based on several assumptions implicit in the prese primitive state of the field of section and placement we developed an experimental approach to studying people-and-jobs. With the objective of developing a systematic language common to both jobs and workers at the semi-low-skilled level we interviewed samples of both. From these taped interviews, using the "behavioral unit" for analysis, we selected the data and developed classification systems for people and for jobs which were largely congruent. Further, we constructed the first approximations of measuring instruments based on the behavioral units and the classification systems.

We have demonstrated the feasibility of developing an analytical "language" common to people and jobs which may be used for matching the two, using either manual or mechanized methods.

PHASE II - Concept validation, instrument development, and the matching model.

Introduction

Now that we had developed an experimental system of dimensions along which both people and jobs could be described, and had taken a first cut at constructing instruments to measure the relative strength of these dimensions, it was necessary to lay out the general approach to take in the application of eventually developed tools.

First, we rejected the traditional approach of the test developers, who attempt to build measuring instruments which will predict judgmental or other so-called "hard" criteria of job success. Second, we decided to follow the logic of our basic concepts to build a decision-making model for the job-to-person screening process based on some operational definitions of occupational adjustment. Third, we decided to use an experimental approach to test the hypotheses generated by the model, taking the risk that these would be found wanting and therefore force us to abandon or seriously change our entire thesis of person-job matching based on the behavioral unit as the analytical building block.

In general, we followed parallel paths of instrument development and test; and hypotheses development and test; expecting that each would feed back to the other as well as save time and money. A detailed description of the methods we used follows.

METHOD

A. Dimension definition and item classification

Using the sub-category definitions described in Phase I, we asked a group of nine judges to sort some 575 behavioral units into the defined 16 sub-categories. The author sorted first and used this sorting as a base against which the others were compared. The author classified

98% of the items exactly as he had for Phase I. For about 80% of the items, all eight judges agreed on classification; in another 10% of the items, six of the judges agreed; in the remaining 10% agreement varied from zero to 6. This provided us with a large pool of items from which we could draw for the reconstruction of two measuring instruments.

B. Revising and re-constructing the Self-Interview Check List:

We changed the name of the person-measuring instrument to "Self-Interview Check List" because it struck us that was exactly what it had become. For each of the sixteen dimensions we selected twenty behavioral units which were classified with either perfect or near-perfect reliability by the judges, and which appeared to best represent a specific sub-category. Units were then assigned at random to twenty check list groups, one behavioral unit from each sub-category to each group. The S.I.C.L. then consisted of twenty groups of sixteen units each. As before, the applicant or subject would be asked to indicate his preferences by picking from each group the two units he liked best, the three he liked next most, the two he disliked the most, and the three he disliked next most. Going through each check list group once more, he indicated what he has done and not done by picking the two items most like what he has done the most, the three like those he has done the next most, the tow most like what he has done the least, and the three representing what he has done next least. Different weights were assigned to these choices.

C. Revising and re-constructing the Job Outline Check List:

We made a number of basic decisions which changed the instrument for describing job requirements much more than the person-describing instrument had been changed. First, we decided on a dual format. Since a job may be considered from both a general and a specific point of view, we decided to develop complementary instruments, which when averaged would give a job profile much closer to the "real" job requirements than either could be alone. Second, we decided that no one person should ever be solely responsible for generating a job profile; instead, this would be done by a supervisor working with a trained catalyst, preferably an industrial engineer or methods man.

For the specific description of the job we developed a check list identical in form to the S.I.C.L., but with different instructions. Specifically, it consisted of ten sixteen-unit groups, one unit from each of the sixteen dimensions. The supervisor picks those two items in each test-group which are most like what has to be done in the job being described, the three which are like the next most required activities; then the two which are like what is least required and would interfere with job accomplishment if done, and finally the three activities like those of next to least value for the job. The supervisor is asked to let the items in the check list represent or "stand for" other similar activities. We felt safe in doing this because of the sorting reliability indicated in "C" above. For the J.O.C.L. we used only job derived activities.

For the general description of the job requirements we developed a card sort plus an "importance" rating scale. We re-wrote the sixteen dimension definitions for simplicity and put each definition, plus some sample activities on the back, on a 3 x 5 card. Instructions are to sort these cards into three piles, five cards to describe what is most required by the job and five to describe what is least required or most interfering; the remaining six to be in a "neutral" pile. Then the five most required dimensions of job activity are rated on an importance scale, while the five least required are rated on a non-importance or interference, scale. This rating becomes the numerical value assigned to the ten selected dimensions.

This dual measurement system for the job made it possible to get an internal reliability check, as well as to account for both specific and general expectations in job requirements. A significant but not extremely high correlation between the two measures would serve as justification for pooling the results; a very high correlation would indicate unexpectedly high reliability and would permit us to use just the card sort for describing jobs; a very low or zero order correlation would tell us to reject what we had done and start all over again.

D. Research design,methods, and findings:

1. We have already pointed out that we intended to test the instruments and our concepts and hypotheses in parallel in order to save time and money and because of the possible value to be gained from interactive feedback between the two processes. And since we were taking an hypotheses-testing rather than a criterion-prediction approach we took every opportunity to load the dice against ourselves because of the immediately practical steps we wanted to take. This will be discussed more fully in our summary of results. Our basic design therefore was to make predictions about relationships in our measures, take the measures, test the predictions on a probability model, and draw conclusions.

2. Our basic organizing principle asserts that in general people seek out those activities in which they are more likely to be successful and avoid those in which they are less likely to achieve this success. Despite the fact that this principle is implicit in present job-seeking and selecting practises, it needs to be tested, at least in our terms. Also implicit in this process is the idea that occupationally well-adjusted people like what they do and believe they are doing well, and further that occupation-

ally well-adjusted people are more likely to stay on a job they have selected than are those who are occupationally maladjusted. In fact, present practise labels the occupationally maladjusted "chronically unemployed," "job-hopper", "unemployable" etc.

We set out, therefore, to test the following hypotheses:

I. In successfully employed people:

- a. There is a positive correlation between workers' self-reported activities history and the management-described requirements of their present jobs.
- b. there is a positive correlation between activities history and preferences
- c. there is a positive correlation between preferences and job requirements.
- d. workers who report relatively low success in their present jobs have lower matches (as in a., b. and c.) than those who report average or higher job success
- e. workers who report low success as well as having low experience-to-preference correlations will have lower person-to-job matches than the average.
- f. workers with average or above job success reports and average or above preference-to-experience correlations will have above average person-to-job matches.

II. Where no criteria for successful employment are used to differentiate between work groups except that they are presently employed, then low or zero-order person-to-job matches will predict work groups with high turnover and other management signs of instability as differentiated from work groups with average or higher person-to-job matches.

3. Samples

To test hypotheses a. to f. above, as well as to test the reliability, dimension independence, and field applicability of our instruments we chose a sample of seven companies in Indianapolis. To cross-test hypotheses a. to f. as well as the instability and turnover hypotheses we worked with the

Honeywell E.D.P. Division in Brighton, Massachusetts.

The seven companies represented a wide range of businesses: insurance company, department store, telephone company, bank, and three manufacturing concerns with a wide range of industrial products. They provided 23 jobs, varying from bank teller, sales clerk, electronics assembler, buffer machine operator, and phone installer-repairman to computer operator. One hundred and seventy-seven workers, in these twenty-three jobs, completed *Self-Interview Check Lists*. The companies were asked to provide workers who had been successfully employed in these jobs for a *minimum of nine months*. Of the total number of subjects fewer than 20 had been successfully employed less than nine months but more than five months.

In keeping with our desire to keep the experiment "pure" as possible we loaded the dice against ourselves by permitting management to select the jobs they wanted to study, to complete the *Job Outline Check Lists* and administer the *Self-Interview Check Lists* without supervision. Each company was given a research outline and these procedures were reviewed with two or three personnel representatives. In this way we tried to come as close to actual operating conditions as possible, where rigid experimental controls are difficult to enforce. In addition to providing the check list materials, the experimenters also provided a data sheet which included three self-evaluation questions concerning perceived success on the present job, which when summed provided the measure used in our analyses. Several companies were asked to administer the *S.I.C.L.* twice within a period of one to four weeks.

Much the same procedures were followed in the Honeywell part of the research, except that the criterion of nine or more months successful employment was *not* applied. Instead, Honeywell management was asked not to differentiate in this way, but to pick twelve work groups, some of which were considered highly unstable. These twelve work-groups had from five to thirteen workers each.

4. Collecting the data and analysis

Over a period of about four months the companies in question administered the Self-Interview Check Lists and completed the Job Outline Check Lists. As the data came in the Check Lists were scored and every response recorded on a summary data sheet in preparation for later transcription to tab cards. All statistical analyses were done by computer, though the author did some rough preliminary analsyses by scatter diagram and graph. In reporting the results of these analsyses we will begin by discussing the research instruments, going then to the testing of the basic concept and the hypotheses it generated, and finally to some exploratory work done in model development.

a. Self Interview Check List

--Internal consistency of the sub-categories was measured in two ways, by the split-half correlation technique and by a random halves technique. Uncorrected correlations were very similar for both techniques, and were generally quite good. Consistencies were higher for preferences than for activities history, probably reflecting the very low number of scores in certain categories such as Verbal and Numerical for our population. As we might expect, consistencies were higher where immediate personal experience was available for most of our respondents.

--Test-retest reliability for each of the 16 sub-categories varied from correlations of +.58 to +.93 on preference instructions, and +.37 to +.85 for experience instructions; generally acceptable.

--Test-retest reliability for the profiles was extraordinarily high. For experience instructions the median interprofile correlation was +.92, with 75% of the correlations above +.83. For preference instructions the median was +.88, with 75% of the correlations above +.80

--Dimension independence was clearly demonstrated. Measured by intercorrelations among the sub-categories and cross-referenced between preference and experience instructions, very few positive intercorrelations were found which were statistically significant.

b. Job Outline Check List

--Conceptual consistency between the J.O.C.L. and the card sort was on the average a correlation of +.67, which though not extremely high is reasonable for this kind of work. We can feel certain that the two measures are consistently tapping similar things in describing jobs. And, just as important, pooling the results of the two job measures is likely to give us a more precise measure of job requirements than either method alone.

c. The basic concept cannot be rejected as a result of our data. Table 2. contains the summary data for the comparison of personal data to job-description data. Using product-moment correlation, five profile comparisons were made for each of the 177 individuals in our sample. These were: 1. Preference with Job-Specific, 2. Preference with Job-General, 3. Experience with Job-Specific, 4. Experience with Job-General, and 5. Preference plus Experience with Job-Specific plus Job-General. In each case the corrected mean of the distribution of interprofile correlations was significantly different from zero, and positive, as we had predicted. Also note that in general the correlations between experience and job profiles are higher than the comparisons between preference and job profiles. The correlations between experience profiles and job-specific profiles are the highest. In fact, the correlation of the combined profiles on both sides of the interaction are hardly discriminable from the experience to job-specific profile correlations.

Because our predictions are borne out in each instance we can feel much more certain that our basic concept of congruity between competency motives of people and the environments they explore is a tenable base from which to build our matching model. This is another way of saying that the "combined probabilities" are much greater than the probability in any single comparison. If one or two of our comparisons had come out in the direction opposite to our prediction, we would have had to seriously consider some different approaches - both conceptually and methodologically.

Profile Correlation Distributions	Corrected Mean	Standard Deviation
1. Experience + Preference vs. Job-Specific +Job-General	+.42	.28
2. Preference vs. Experience	+.57	.32
3. Job-Specific vs. Job General	+.67	.16
4. Preference vs. Job-Specific	+.31	.29
5. Preference vs. Job-General	+.26	.27
6. Experience vs. Job-Specific	+.39	.27
7. Experience vs. Job-General	+.26	.27

Table 2. Corrected means and standard deviations for distributions of interprofile correlations as indicated. One hundred seventy-seven incumbents in twenty-three jobs for nine months or more (about 20 subjects were on job less time.)

d. The hypotheses relating person-to-job match and self-reported success was tested by comparing the average interprofile correlations of subjects who reported below average success with those who reported average or better. "Success" was measured by the combination of the ratings on three questions: 1, How well prepared to deal with your job are you in comparison to your fellow workers? 2. What are your chances for promotion, etc.? and 3. How good a job do you think you do, etc.? Each individual rated himself on a five-point scale for each of these questions. Our "average" is based on the mean of the response scores, not on the average point in the rating scale. Total possible combined score was 15, the mean was 11.3. After some graphic analysis we decided that the people who had given themselves perfect scores were probably "reaction-forming" so we grouped them with the below average success subjects for purposes of analysis. Table 3. provides the summary data for these two groups.

Profile Correlation Distributions	I. Average and High Self-Evaluations		II. Below Average Self-Evaluations	
	Mean	S.D.	Mean	S.D.
1. Experience + Preference vs. Job-Specific + Job-General	+.44	.26	+.33	.32
2. Preference vs. Experience	+.64	.29	+.48	.37
3. Job-Specific vs. Job-General	+.67	.19	+.67	.20
4. Preference vs. Job-Specific	+.37	.28	+.24	.35
5. Preference vs. Job-General	+.28	.26	+.24	.31
6. Experience vs. Job-Specific	+.41	.27	+.34	.28
7. Experience vs. Job-General	+.32	.23	+.29	.28

Table 3. Corrected means and standard deviations for distributions of interprofile correlations of data from two groups of subjects. One hundred five subjects with success self-evaluations 11 to 14, seventy-two subjects with self-evaluations 6 to 10, and 15. Mean self-evaluation is 11.3.

The data confirms our hypotheses that those people who believe they are less successful than the average employee are more likely to be poorer matches to their jobs, in terms of our techniques for describing jobs and their incumbents.

e. The hypotheses relating low sucess report combined with low experience-to-preference correlation to the degree of job-person match was tested in the following manner. First, we defined a group we called "occupationally maladjusted" as being those subjects in our sample who had below average evaluations of success as well as below average preference-to-experience correlations. This was our way of operationally defining those people who have a history of doing what they don't like and feel unsuccessful in their present jobs. We predicted that about 15% of our group would meet these criteria in a statistical concept of maladjustment. Actually, 28 or 16% of our 177 subject sample met these criteria. This group of occupationally maladjusted individuals should have either zero order person-to-job matches or matches which are significantly less than for the "adjusted" group. The "adjusted" group had average or higher self-evaluations and average or higher preference-to-experience correlations. Table 4. presents the summary data for both groups.

Profile Correlation Distributions	"Occupationally Adjusted"		"Occupationally Maladjusted"	
	Mean	S.D.	Mean	S.D.
Experience + Preference vs. 1. Job-Specific + Job-General	+.47	.27	+.22	.33
2. Job-Specific vs. Job-General	+.68	.16	+.67	.21
3. Preference vs. Experience	+.77	.17	+.04	.27
4. Preference vs. Job-Specific	+.41	.26	+.03	.37
5. Preference vs. Job-General	+.31	.27	+.05	.28
6. Experience vs. Job-Specific	+.44	.28	+.29	.26
7. Experience vs. Job-General	+.31	.26	+.20	.22

Table 4. Corrected means and standard deviations for distributions of interprofile correlations from two groups of subjects. Twenty-eight subjects "Occupationally Maladusted" (self-evaluation below average, preference-to-experience correlation below average). Seventy-nine subjects "Occupationally Adjusted" (self-evaluation average and higher, preference-to-experience correlation average and higher.)

Our findings here are more startling than any up to this point and the table deserves some interpretations. First, all differences in level of match between person and job are in the predicted direction - that is, in each case the "maladjusted" have lower level matches than do the "adjusted." Further, some of the differences are quite large and are statistically significant in and of themselves. The combined probabilities make it extremely unlikely that these are chance events so we can accept them with little fear of being wrong. Beyond the obvious conclusions which back up our original theses, there are some interesting data about the process of matching as it now goes on. Notice the largest difference we find if for preference to job-specific correlation for the maladjusted the mean correlation is.03, while for the adjusted group this mean is .41.

Profile Correlation Distributions	Eight Stable Work-Groups Means	Four Low-Stability Work-Groups Means
1. Experience + Preference vs. Job-Spec. + Job-General	+.49	+.04
2. Job-Specific vs. Job-General	+.77	+.71
3. Preference vs. Experience	+.44	+.21
4. Preference vs. Job-Specific	+.37	-.14
5. Preference vs. Job-General	+.31	-.21
6. Experience vs. Job-Specific	+.46	+.26
7. Experience vs. Job-General	+.40	+.21

Table 5. Corrected means of distributions of interprofile correlations for four groups of workers with low job stability, and eight groups with "adequate" or better stability.

f. The Honeywell Experiment took place in the manufacturing plant of Honeywell Inc. EDP Division in Brighton, Massachusetts. Eighty-three employees working in twelve different factory jobs were administered the Self-Interview Check List, while their supervisors completed the Job Outline Check List with the help of a personnel man who had been trained by the experimenters. Management considered four of the work groups quite unstable and considered the other eight satisfactory. A summary of findings for these groups appears in Table 5.

The four "unstable" work groups had high employee turnover, some of it deliberately caused by management. For instance, one group was a kind of replacement depot for workers coming out of one grade and preparing to go into another. We were all fascinaaed by the results which so clearly differentiate between the two stability groups. Notice how little account is taken of the preferences of the worker! Yet where the preference-to-job requirements correlation is higher, the turnover is lower. These results are remarkably like the Indianapolis results, if we can compare the more stable work groups to the Indianapolis criterion of nine months or more on the job. Further, the "occupationally maladjusted" workers in the stable groups had lower job-to-person matches than did the "adjusted" workers in these groups.

The Honeywell study confirms the results of the Indianapolis experiment and serves as a cross-validation of the basic

> concepts and the hypotheses generated by them. In addition, it confirms our prediction that employee turnover is at least partially a function of the extent of match between a worker's background and the requirements of the job into which he goes. It also confirms our hunch that job success must be considered as much from the employees' point of view as from management's. Employee turnover is always to some degree a measure of the extent a job satisfies an employee. The very low preference-to-job correlations among those in the low-stability jobs strongly suggests this, and predicts expensive turnover for the management.

Discussion of Results:

It should be helpful at this point to review our basic objectives and to indicate the relevance of the work and findings of Phase II to these objectives. Our prime objective was the development of a system for matching people and jobs at the semi-low-skill levels which can be computerized where large numbers of jobs and people are involved. As a step in that direction we outlined a matching model which asserts that the optimal "match" between a person and a job is likely to be achieved when the person's activities preferences and experiences are highly correlated with the activities demands of the job. Both job and person activities are to be described in the same terms. That sounds like good common sense, but up to now the scientific operations leading to a systematic matching of people and jobs individually or en masse have generally been quite elusive. Therefore, it was necessary to test both the operations and the hypotheses generated by basic concepts in order to come to an operational system for the matching of people and jobs in which we can have reasonable confidence.

From an operational point of view it was necessary to develop instruments for measuring and analyzing the preferences and experiences of people as well as for measuring the activities demands of jobs. To these ends, the Self-Interviewing Check List was designed to generate a when combined, provided a resultant profile of a person's relative tendencies to approach and avoid the kinds of activities represented by the dimensions of the profile. The Job Outline Check List and the Job Card Sort, taken together, provided a resultant profile of the relative positive-negative demand of each for the classes of activities represented by the sixteen dimensions of the profile.

A basic requirement of any measuring instrument is its reliability, its ability to provide the same score each time that it is used under similar circumstances. In addition, a profile instrument must demonstrate that each of the dimensions of the profile are relatively independent of the others, therefore measuring different aspects of the person or situation, and are internally consistent. Our data indicate a very high degree of profile reliability. This reliability is so unusually high for work of this kind that we must ascribe it to the fact that every behavioral unit in the instrument came from a group of people typically employed in semi-/low-skilled jobs. Therefore, little error was added because of the unfamiliarity with the content. Further, an acceptably high degree of positive independence between dimensions was achieved; probably due to the care with which units were sorted and assigned to sub-categories. And since internal consistency measures were generally satisfactory we can feel quite confident about the structure of the Self-Interview Check List.

Since we did no "test'retest" experiment with the job descriptive instruments we must have recourse to its analogy to the Self-Interview Check List to support the need for profile reliability. However, we did demonstrate dimension independence for the Job Outline Check List even better than that of the S.I.C.L. as well as a high degree of consistency between the two job descriptive instruments. In order to have the same high degree of confidence in these instruments as with the S.I.C.L. it will be necessary to conduct a test-retest experiment. The information presently available, however, is adequate to support the continued use of our job-descriptive techniques.

Having a structurally sound set of measuring instruments is not enough to justify their use in an operational situation. It is also necessary to demonstrate that obtained measures are consistent with the set of basic concepts with which we are working, as well as with relevant aspects of the "real world" outside our theoretical structure. This "real world" can be represented both by other successful theories and by independent data about the people and situations with which we are concerned. Psychologists usually call these processes "construct" and "criterion" validation - another way of saying that the instruments probably measure what they are supposed to measure.

The presentation of the results data indicates that in every respect attempted our operations have demonstrated adequate construct validity and criterion validity. Yet some discussion of rationale is probably necessary. The only characteristic common to the 177 workers in 23 jobs at seven companies is that they are considered "successful" employees by their management - in addition, about 90% had been on their jobs for nine months or longer. The criterion of success is here considered both from the point of view of the worker and of the management. That is, the management chose to keep the worker and the worker chose to stay on the job. Job longevity has meaning only if considered in terms of the interaction between the worker and his job situation. Since we also asked the workers to rate the degree of success they believed they were having in their jobs, we can construe this as a rating of the management's ability to provide a satisfactory experience for the worker. Note in Table 3., that where worker and management success ratings agree the "match" between person profile and job profile is significantly higher than where success ratings disagree (Col. II). This explanation is reinforced by the data from the Honeywell experiment where turnover and job instability on a group basis is clearly a function of "match" between person and job profiles. And in both experiments it is clear that the relatively lower degree of attention paid to preferences of workers in placing them in jobs (both by workers and management) accounts for much of the low success data. Discussions with personnel workers in both experiments reinforced the notion that relatively little attention is paid to the preferences of semi-/low-skilled applicants when they are being considered for available jobs.

If one traces the changes in the "preferences" to "experiences" correlations through the Tables, one is struck by the fact that these changes can be predicted by a theory of personal adjustment developed by Carl Rogers. This theory holds that in general the well-adjusted person describes his present self and his ideal self as being very much the same. Clinical experiments with people involved in psychotherapy have generally borne out the theoretical predictions. If we think of preference profile as representing the "ideal" and experiences profile as the "real" we can make analogous predictions for job adjustment. In Table 3. the "Average and High Self-Evaluations" subjects have higher levels of experience-to-preference correlations. In Table 5., for the Honeywell experiment, the "Eight stable work groups" have higher levels of experience-to-preference correlations than do the "Four low-stability work groups." These are precisely the predictions which Rogers' clinical theory would have to make. Since management generally pays little or no attention to the preferences of applicants for semi-/low-sill jobs they are likely to be inducing occupational maladjustment! The implications of this for the large group of chronically unemployed, or "hard-core," among our minority groups are staggering.

Our attention therefore turns to Table 4., which, in our estimation, contains the most critical data in the experiments. Our operational definition of "occupationally maladjusted" corresponds to a clinical definition inasmuch as it demands a history of low preference-to-experiences correlation as well as an indication of dissatisfaction with one's present situation. This makes it more probably that subjects who meet the double criterion are indeed maladjusted occupationally, and, therefore, most likely to express dissatisfaction by leaving their jobs. The Indianapolis experiment was not designed to demonstrate this, but the Honeywell experiment clearly shows the instability and turnover as a function of our measures of occupational maladjustment. Table 4. shows the functional relationship between degree of person-to-job match and degree of occupational adjustment. Note the zero order correlations between preferences and job for the occupationally maladjusted group - a finding which further confirms the evidence in Table 3. that management may indeed be inducing maladjustment by generally ignoring the activities preferences of applicants for low-level jobs. The evidence very strongly suggests that if a job-seeker does not take his own preferences into account he cannot depend on the employer to do so. Rather the employer tends to make his selection chiefly on the basis of "experience." Unfortunately, he thus tends to reinforce the self-punitive cycle of the maladjusted - and of the employer in terms of generalized dissatisfaction, quality problems, and higher turnover.

It is quite clear to us that the matching model we have outlined is supported by the data of our two experiments. It now remains for us to describe the model concisely and analytically, to translate this into operational systems which can be used for actually matching people and jobs, and to field-test the operational system.

The Operational Matching Model:

The evidence of the Indianapolis and Honeywell experiments has provided strong evidence for the validity of our instruments and the concepts from which they were developed. An operational system demands that all workers and jobs being handled by our system can be matched according to the principles of optimal adjustment or adaptation. In other words, a good job-person matching system should promote the well-being of both the worker and the employer. The data available from the experiments provide possible bases for optimizing the correlation between the activities profiles of a worker and the demands profiles of a job.

Of the Indianapolis sample we found 52 workers in 22 of the jobs who had average and higher self-evaluations, average or higher preference-to-experience correlations, and average or higher person-to-job correlations. These are the individuals considered occupationally adjusted who are presently employed in jobs which match their backgrounds. We decided to use this group as the base for designing the operational model.

We had to find out, for each of the sixteen dimensions, the optimal relationship of preference and experience to job-general and job-specific. How do "well-adjusted" workers weight their activities preferences with their experiences in accepting jobs; in interaction with employers who "select" them for jobs to which they match at average or better levels? In parallel, how do supervisors weight their specific job demands with their general concepts of job demands when "selecting" an applicant who has "selected" their available job? In other words, how can we mathematically describe the optimal relationships between preference and experience on the one hand with job-specific and job-general on the other in order to promote the adjustment of the individual and a good job done for the employer? We chose to explore this problem by examining each of the sixteen dimensions separately, attempting to discover general principles which can be applied to overall profiles as a first approximation of the model.

For each dimension we computed eleven separate correlations of the preference score to a resultant job score which consisted of job-specific score weighted by 1, plus job-general score, weighted by from -5 to +6. Exactly the same procedure was followed in computing eleven correlations of experience score to job score. Through graphic analysis we determined which weighting of job-general have the highest correlation in each series of eleven correlations. Figure 3., the graphic representation of this series of correlations for the Locomotion dimension, is typical of our findings for 13 of the 16 dimensions. In general, we found approximately equal correlations for preference-to-job and for experience-to-job at each point. The correlations usually rise rapidly as job-general weighting increases from -5 to 0, then either level off at about +1, or rise or decline very slowly as weighting increases to +6. The general principle emerging from this analysis tells us to weight preference and experience scores by one; and to weight the job-specific and job-general scores by one. In other words, the simple summing of the two raw scores for each set (or their arithmetic mean) appears to provide the optimal matches for our "healthy" well-matched sample.

Since preference and experience scores are weighted equally by the Self-Interview Check List, this implies that occupationally adjusted workers usually give about equal importance to their own activities experiences and preferences when seeking and accepting jobs for themselves. The scoring scales for job-specific and job-general are quite different, however. For job-specific, the Job Outline Check List provides scores which can range from -20 to +20, while the Job Card Sort provides scores

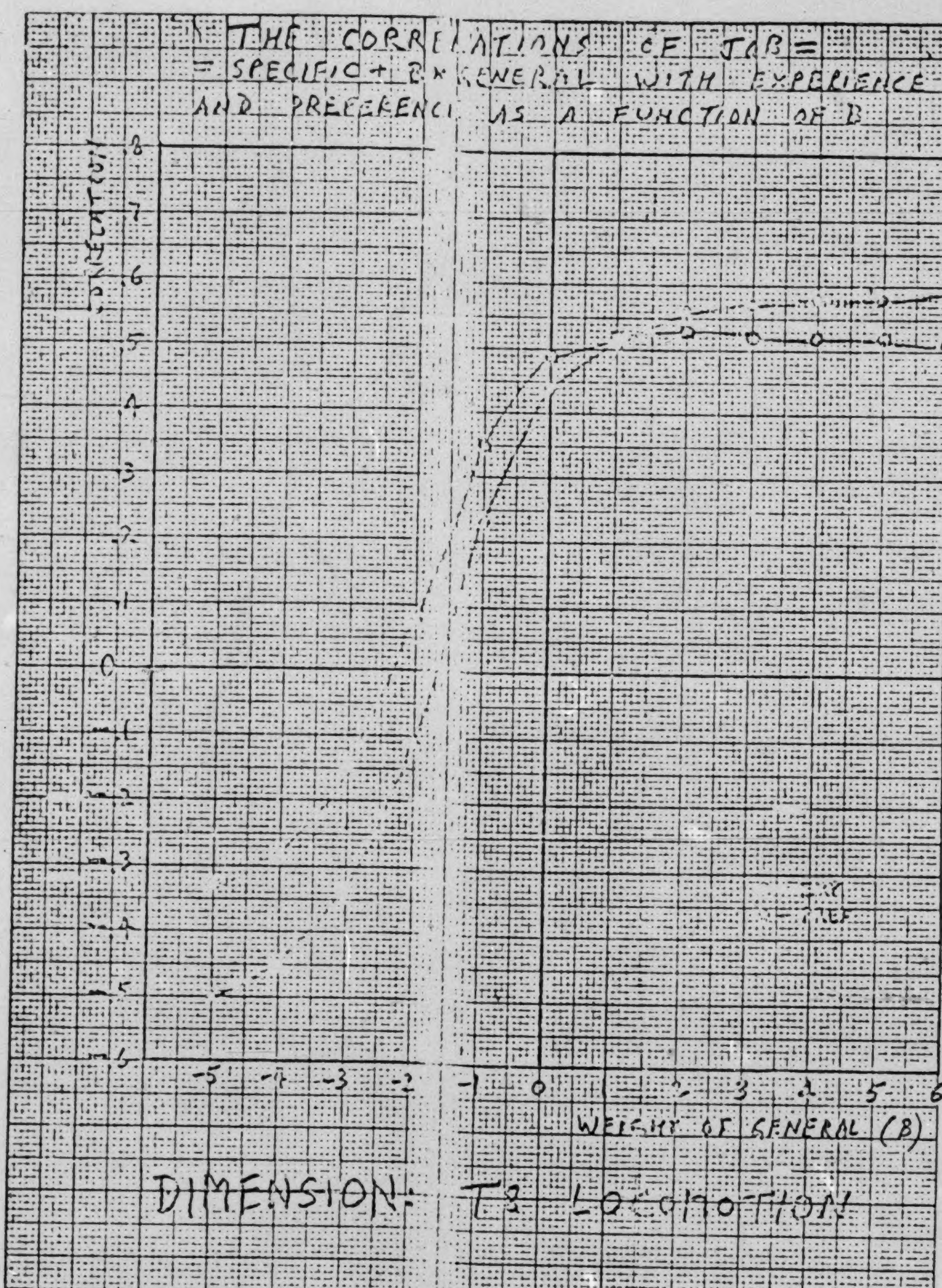

THE CORRELATIONS OF JOB =
= SPECIFIC + B × GENERAL WITH EXPERIENCE
AND PREFERENCE AS A FUNCTION OF B
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
WEIGHT OF GENERAL (B)
PREF
DIMENSION: T3 LOCOMOTION

Figure 3.

which can range only from -5 to +5. This means that the relative size of the job-specific score can reach up to four times the value of job-general raw scores. Statistical analysis reveals that this relative value empirically varies from zero to four, with the average at about 2.6. It appears to be a happy accident that the arbitrary weighting scheme originally applied turns out to be about optimal. We have little doubt that, as much more data is collected, variable weights by dimension for preference and experience and for job-specific and job-general will be indicated.

It is very interesting to note that two of the profile dimensions did not follow the general "law" exemplified by Figure 3., and suggest some interesting questions about the effects of supervisory expectations in interaction with worker backgrounds. Figure 4. shows the preference and experience correlations with job score for these two dimensions; Order and Fine Manual. Note that the preference-to-job correlations vary very little around zero. The experience-to-job correlations are inverse to the general law, with Order more extremely so. In these cases we are faced with the interesting notion that while supervisory demands increase, worker background decreases! Considered interactively, this could mean that workers with the most Order experiences avoid jobs with high Order demands and that the supervisors of these jobs do not hire or keep workers whose backgrounds best suit them to meet the Order requirements. The same tendency appears in the Fine Manual dimension.

Aside from the minor anomalies discussed in the preceding paragraph, there is an amazing level of correlation consistency from dimension to dimension. For example, the average difference between experience-to-job correlation with a Job-General weighting of 1 and the optimal correlations with other weightings is about .05; exclusing the exceptional Fine Manual and Order dimensions already discussed. For the preference-to-job correlations this average difference is .02. The highest correlations appear in the Gross-Manual - Independent and Dependent, Correction, Locomotion, Service, and Verbal dimensions, all +.40 or higher. The lowest appear in Fine Manual, Order, Management, and Artistic-Creative dimensions, all zero order or negative. Such a distribution might have been expected from a sample of workers and jobs such as ours, and the low correlations are probably also a function of the relatively low number of choices in some of these areas. Certainly, the semi-to-low-skilled people and jobs examined here are likely to have little experience or job requirements in the Management and Artistic-Creative dimensions. Perhaps the negative relationships in the Fine Manual and Order dimensions are also a function of our samples. Only further research with other large groups of workers and jobs will clear up this question. The evidence is not yet sufficient to give differential weights to the various dimensions beyond that provided by the person and job profiles. Similar analyses of the Honeywell experimental data will be done to search for similarities and differences.

In review then, our data appear to recommend that an operational matching model give no differential weightings to preference and experience when combining them to form a resultant profile. The same recommendation is made for combining the job-general and job-specific profiles. That is, the raw scores provided by the Self-Interview Check List, the Job Outline Check List, and the Job Card Sort are to be used without modification. The model also calls for the use of the product-moment correlation as the basic method of determining degree of similarity between a combined person-profile and a combined job-profile. The use of suitable computer software with

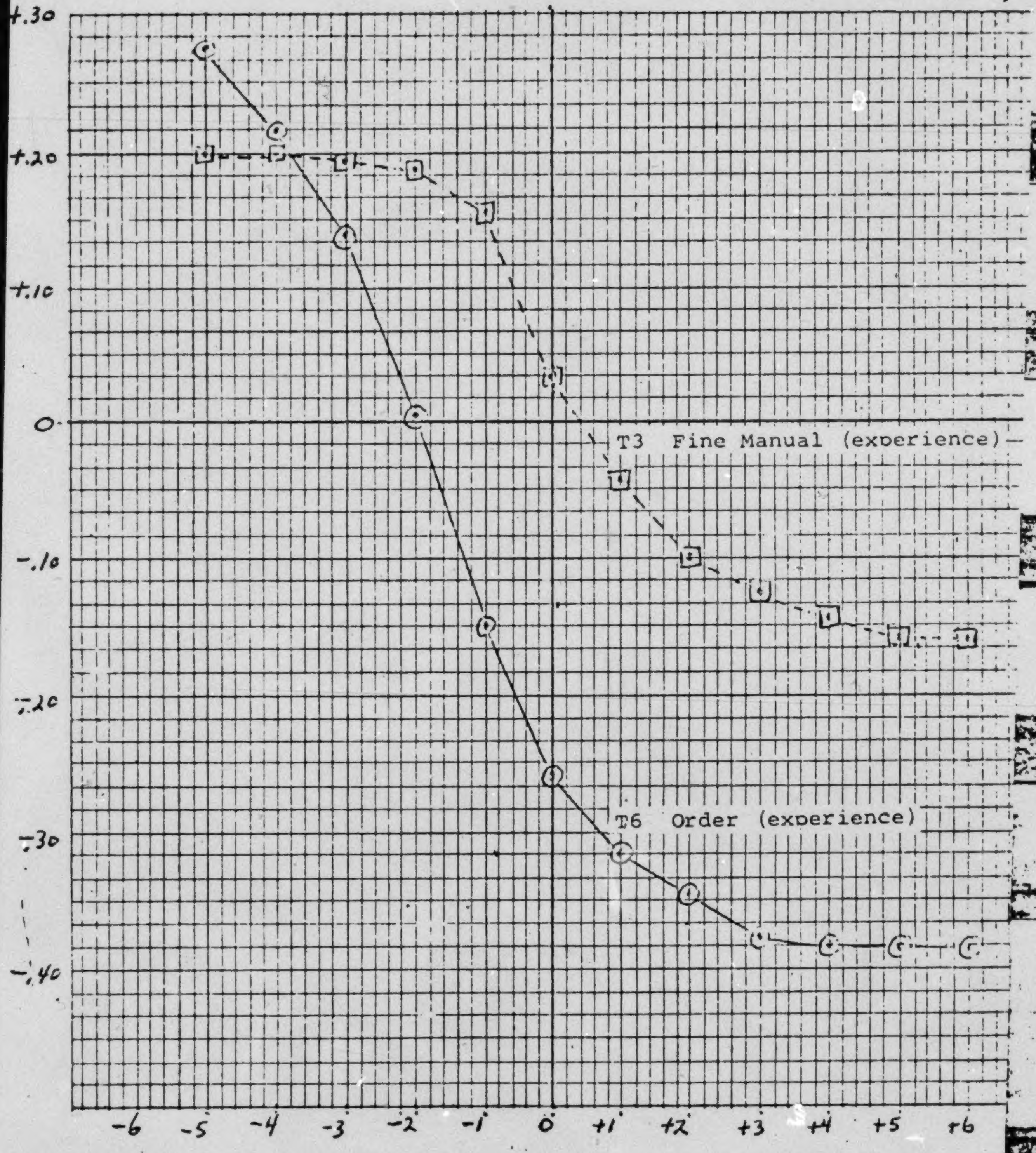


Figure 4. Correlations (r) of Experience scores with Job Scores (Job = Specific ≠ (B)General) as a function of (B). Shown for "unusual" dimensions only.

relatively simple programs will make possible the storage of large "banks" of person profiles on the one hand and of job profiles on the other; each of which can be searched for above average correlations; depending on whether a person is looking for a job or a job is looking for a person. Relatively simple hand analytical procedures will make it possible to do these searches manually where only small numbers of jobs and/or people are involved. Such procedures are presently under development.

Projected Developments

In keeping with our basic concepts, we intend to develop a parallel set of techniques for exploring and measuring the social and emotional needs of workers and the social and emotional demands of jobs they may go into. A system which helps the matching process by optimizing the congruence between the emotional and social requirements of both jobs and people, working in bonjunction with the competency oriented system described here should significantly increase the predictive capacity of the present system. Further, since human beings seek out complexity levels as well as content dimensions in their search for satisfying activities we intend to do the research which will make it possible to provide a "complexity weighting" for the presently defined profiles. Such a content-complexity profile should prove to be a good predictor of potential for personal development within job families and hierarchies described by our system.

At the present time (January, 1969) a major program has been initiated in the State of New Jersey, under contract with the Department of Labor and Industry, to field test the "Cleff Matching System" in several Employment Service offices. It is expected that eventually the system will become integrated with the State's Unemployment Compensation and Employment Services systems. Efforts are also underway in several companies, which are exploring possible applications for their screening, hiring, and training programs with the "hard-core unemployed" as well as their more typical employees. The Office of Economic Opportunity, working with the North Carolina Manpower Development Corporation, has embarked on a series of field tests and further developments of our system to apply to the functionally illiterate.

APPENDIX C

Statement of Work from the contract awarded ADP-PDS, Inc. for the implementation of the New Jersey/Cleff Experiment.

OEO Contract No. BIC-5261, "Assess and Match to Jobs Thirty-five Hundred Disadvantaged Individuals Using the Cleff Job Matching System," June 28, 1971.

SCHEDULE

CLAUSE I. STATEMENT OF WORK:

A. Detailed Requirement

The Contractor shall provide for a twelve (12) month's period all necessary qualified personnel, facilities, materials and services (including travel and per diem) required to assess and match to jobs thirty-five hundred (3,500) disadvantaged individuals using the Cleff Job Matching System (CJMS).

In the conduct of this work, the Contractor shall carry out the following tasks:

1. Use the Cleff Job Matching System to match and attempt to place 3,500 unemployed and underemployed poor persons in the Newark, New Jersey labor market area.
2. Provide for a distribution of Black, Anglo, and Spanish speaking persons consistent with representation of each group among the unemployed and underemployed.
3. Provide for a control group of persons (Black, Anglo, and Spanish-speaking) proportionally representative of the experimental group.
4. Provide for referrals for both the experimental group and the control group to public and private sector jobs at a ratio of 1:2.
5. Provide for recruitment, matching and job profiling through (1) the Business and industrial Coordinating Council (BICC) of Newark, New Jersey, (2) Model Cities projects and (3) the New Jersey Rehabilitation Commission in groups of approximately 1000-1200 applicants for each of the above three organization. The final referral and job placement to be the responsibility of each of the above organizations in accordance with their regular operating procedures.
6. Provide for the data necessary for the evaluation of the program and reports specified under Deliverable Items and Schedule below.
7. Conduct five (5) information and training seminars of approximately two (2) days duration each at Contractor's or BICC premises. The information portion of the seminars shall provide data on progress to date. The training portion of the seminars shall provide training for potential users in the operation of the CJMS. The first seminar will be held at the end of four (4) months of operation, the remainder on a bi-monthly basis. The Contractor, in conjunction with the OEO Project Manager shall notify participant's from the following groups:

    (a) Private employers and Associations
    (b) Public Employer (Government)
    (c) Government Manpower Program operators i.e., WIN, CEP, NAB, etc.
    (d) Independent Sectors Manpower Program Operators i.e. BICC, OIC, BEU, Urban League
    (e) Special Emphasis Programs i.e. Health, Vocation Rehabilitation Migrant Workers, Welfare Family Assistance

    Travel and per diem expenses will be borne by the participants

SCHEDULE

CLAUSE I. STATEMENT OF WORK (Continued):

B. Deliverable Items and Schedule

Submit the following reports and data to the Project Manager during the period of this contract:

1. A statement within thirty (30) days of the date of award, indicating the random selection process to be used with the experimental and control groups. The statistical basis for determining the size of the control group and the subgroupings to be used for the purpose of comparisons shall be included in the statement.

2. Progress report, six (6) copies every two (2) months, by the 10th calendar day of the month succeeding the reporting period, detailing the work performed hereunder. The first report shall detail the first sixty (60) days of operation indicating the state of applicant recruitment and job profile development; the remaining reports shall include data to be utilized in the seminars.

3. Six (6) copies of training materials developed for the information and training seminars to be conducted hereunder. This material shall cover:

   (1) the overall operation of the CJMS as an integral part of the using organization's operation, (2) the recruitment and training of staff for the CJMS, (3) the administration of the Self Interview Check List for applicants, (4) job development using the Job Outline Check List, (5) interpretation of results of the matching process (6) technical systems operations concerning the computer and associated activities (7) counseling using the CJMS and (8) general administrativo requirements.

4. Final Report, Six (6) copies and one (1) reproducible copy therefor, summarizing the Contractor's total effort hereunder and including the training package developed during the contract period, upon completion of all work hereunder.

   The Final Report shall include the information collected in the performance of this contract pursuing to BICC Forms "Appendix D" of the Contractor's proposal as well as the following operation data:

   A. Effect on hiring
   B. Effect on retention
   C. Effect on mobility or advancement
   D. Effect on quality of job (wages, types)
   E. Effect on job performance
   F. Effect on turnover (individual and job)
   G. Effect on public and private job
   H. Effect on Spanish speaking, Black, Anglo

SCHEDULE

CLAUSE I. STATEMENT OF WORK (Continued):

One (1) copy of each report under 1, 2 and 4 above shall be submitted concurrently to the OEO Contracting Officer.

C. Reporting Information

Reports shall include the following information.

a. Activity Status

(1) Selection of Applicants for Experimental Group
(2) Selection of Applicants for Control Group
(3) Non-OEO Training and Support Services
(4) Job Profiling
(5) Job Placement
(6) Computer Operations
(7) Evaluation

b. Statistical

(1) Number in Experimental Group
(2) Number in Control Group
(3) Number of Jobs in Job Bank
(4) Number of People Placed in Jobs
(5) Number in Training Programs Related to Job Placement
(6) Number referred to other Agencies for Assistance
(7) Retention to Date
(8) Detailed Data

    (a) Sex and Age
    (b) Ethnic Make-up of Group
    (c) Education Level
    (d) Income Level Prior to Placement
    (e) Employment History - Individual's Turnover Rate
    (f) Previous Contact with other Agencies
    (g) Arrest or Conviction Record
    (h) Placement Wage Range
    (i) Placement Wage Average
    (j) Occupational Adjustment indexes
    (k) Match Indexes
    (l) Profile Difference Indexes
    (m) Match/Difference Ratios

APPENDIX D

Statement of Work contained in OEO RFP PD 72-54 for the evaluation of the New Jersey/Cleff experiment.

"Evaluation and Analysis of Job-Client (Cleff) Matching Project (in New Jersey)," OEO RFP No. PD 72-54, 26 May 1972.

SCHEDULE

CLAUSE I. STATEMENT OF WORK:

A. Background:

Job-Man Matching is not a new concept. The Directory of Occupational Titles originally published in 1939 was the first systematic attempt to get at the problem of improved job placement. The DOT is a classification scheme which arranges occupations according to their interrelationships, standardizes job titles and defines generally what each job involves. As a tool for identifying occupational areas and the general kinds of job titles and jobs which occur in each the DOT is useful. However, the kinds of information available in the DOT appear to be of little value in attempting to match an individual person to an individual job at the entry or semi-skilled level. An example of this rigidity is that identical DOT codes assume identical job characteristics when in fact no two jobs are identical. Likewise, no two individuals are identical yet the assignment of the same DOT code to two individuals assumes this univocal relationship.

Major weakness of other systems is that they require that people be described on the basis of job experience. This approach is highly questionable from several standpoints when used for matching at the entry and semi-skilled level.

1) If an individual does not have any job experience, no match can be made.

2) It assumes that an individual that does have job experience is only suitable for a job in the area of his experience.

3) The primary mechanism for determining an individual's experience, suitability and likes and dislikes is the subjective judgement of a counselor/interviewer.

4) Job Analysis tends to be based primarily on employer opinion of requirements rather than on scientific assessment of job content.

In an attempt to explore potentially more effective approaches to matching disadvantaged individuals and jobs and to address the above stated problems, the Office of Program Development, Community Development Division funded a project in Newark, New Jersey from July 1971 thru October 1972 to test a Job Matching system based on the compatability of the behavioral content of jobs and the behavioral preference and experience of individuals.

The Cleff Job Matching System (CJMS) is an automated job-person matching system which "matches" people at the entry or semi-skilled level with job training situations. The methodology uses a set of behavioral variables common to both persons and jobs. The person is matched to the job on the basis of behavioral preference and experience.

SCHEDULE

CLAUSE 1. STATEMENT OF WORK (Continued):

The CJMS uses a scheme of profiling basic work related behaviors which describe both people and jobs in precisely the same terms. The basic premise is that the interrelationships of these behaviors (or "dimensions") predict both good employee performance and personal job satisfaction.

These "dimensions" are incorporated in a matching system based on two self-administered instruments. The Self-Interview Check List (SICL) is used to get information on the experience factors, preferences, and motivational factors which are used to describe an individual in terms of what he has done and avoided doing and what he would like to do. The scoring of the SICL produces a man profile of the individual in terms of his positive and negative preferences and experiences and indicates how well or poorly adjusted he is to work in general.

The Job Outline Check List (JOCL) does for the job what the SICL does for the person; it describes the job in these same sixteen dimensions producing a job profile. The computer completes the matching of the individual to various jobs according to the compatibility of the person and job profile. This is not a "go-no go" relationship but indicates the degree to which a person matches a job in a given environment.

The project operated by ADD/PDS, Inc. in Newark, New Jersey involves the use of the Cleff Job Matching System by several participating agencies. (See Attachment "A" hereof). A total of 3,500 participants will be processed by the participating agencies using the Cleff Job Matching System. The agencies will process a control group of 800 participants without use of the system. The results of referral, placement, and retention with both groups will be compared to determine the qualitative differences. The data which will be provided by the project operator (ADP) Personnel Data Systems, Inc. is as follows:

a. Activity Status

(1) Selection of Applicants for Experimental Group
(2) Selection of Applicants for Control Group
(3) Non-OEO Training and Support Services
(4) Job Profiling
(5) Job Placement
(6) Computer Operations
(7) Evaluation

b. Statistical

(1) Number in Experimental Group
(2) Number in Control Group
(3) Number of Jobs in Job Bank
(4) Number of People Placed in Jobs
(5) Number in Training Programs Related to Job Placement

SCHEDULE

CLAUSE I. STATEMENT OF WORK (Continued):

(6) Number referred to other Agencies for Assistance
(7) Retention to Date
(8) Detailed Data

(a) Sex and Age
(b) Ethnic Make-up of Group
(c) Education Level
(d) Income Level Prior to Placement
(e) Employment History - Individual's Turnover Rate
(f) Previous Contact with other Agencies
(g) Arrest or Conviction Record
(h) Placement Wage Range
(i) Placement Wage Average
(j) Occupational Adjustment indexes
(k) Match Indexes
(i) Profile Difference Indexes
(m) Match/Difference Ratios

The Contractor shall keep confidential in all instances any data identifying Individuals.

Follow-up data will not be provided by ADP/PDS, Inc. but will be included as a part of the work performed under this evaluation contract.

B. Purpose of the Evaluation:

This evaluation is to determine whether the Cleff Job Matching System is superior to traditional job placement methods. Criteria of success are primarily job retention rates, job satisfaction, job performance. Other criteria will also be considered, such as placement rate, employer satisfaction with the system.

1. Analytic Questions:

(a) A group of low-income inner-city residents placed in jobs by use of the Cleff Job Matching System will be compared to a control group placed by traditional placement agency methods to determine if there is any systematic difference favoring one method over the other on the following measures of "success."

. Percent referred to jobs

. Percent of referrals offered jobs

. Percent of referrals placed

. Percent of total processed placed and offered jobs

. Job retention rate

. Movement to a better job (salary, status, position, potential for promotion)

SCHEDULE

CLAUSE I. STATEMENT OF WORK (Continued):

- Job advancement - pormotion, salary increase
- Client satisfaction with job
- Job performance
- Percent taking jobs of those who were offered jobs
- Percent "no shows" having accepted a job offer.

(b) Does the use of CJMS produce any changes in the agency's operations?

(c) Is there a relationship between scores on the suitability index and the occupational adjustment index and the success criteria (experimental group only).

- Referrals offered a job
- Placements
- Job Retention
- Supervisor Rating of Job Performance
- Client Rating of Job Satisfaction
- Raises, Promotions, Change to a better job
- Likelihood of accepting an offered job
- Likelihood of being a "no show" on an offered job.

(d) Are there "Hawthorne Effects" or other interactions between the CJMS and traditional agency operations?

(e) Is the CJMS more likely to place a person into a rewarding career-i.e., for those who leave their original job, is the CJMS client more likely to move on to a better job?

(f) What do employeers think of the CJMS?

(g) What do the placement agencies think of the CJMS?

SCHEDULE

CLAUSE I. STATEMENT OF WORK (Continued):

2. Dependent Variables: (Criteria, Output Measures)

- Referrals To Jobs
- Referrals To Other Agencies or Training
- Referrals Offered Jobs
- Referrals Offered Jobs Who Accept Jobs (Placements)
- Job Quality: Wage Level, Potential for Promotion, SES Status, Desirability of Work
- Client Satisfaction With Job
- Client's Job Performance
- Job Retention
- Raises, Promotions, Changes To Better Job

3. Independent Variables:

- Type of Placement System -- CJMS or Traditional
- CJMS Scores
- Occupational Adjustment Index
- Match Index
- Profile Difference Index
- Match Difference Ratio
- Sex
- Ethnicity
- Age
- Education
- Employment History
- History of Contact With Other Agencies
- Criminal Record

SCHEDULE

CLAUSE I. STATEMENT OF WORK (Continued):

C. Detailed Requirements:

The Contractor shall provide all necessary facilities and qualified personnel required to conduct an evaluation of the OEO Cleff Job Matching New Jersey experiment. The conduct of this evaluation shall include, but not be limited to, the tasks described below:

1. Analyze and report all data collected by the Project including:
   - Effects of the CJMS on Hiring
   - Effects of the CJMS on Job Quality (Wages, Type of Job Etc.)
   - Differential Effects in Private and Public Job Markets
   - Differential Effects among ethnic population (Spanish Speaking, Black, White)
   - Effect of CJMS on Referrals, Acceptance, Placement
   - Effect of CJMS on Referrals to other agencies or to training
   - Effect of Independent Variables on Dependent Variables

     (Multi-Variate Analysis Where Appropriate)
   - Relationship of CJMS Scores to Placement Effects
2. Determine the current employment status (as of Nov. 1, 1972) for the 800 members of the control group and 3,500 members of the experimental group.
3. Conduct the following interviews pursuant to accessing the effectiveness of the CJMS:

   (a) All members of the control group placed in jobs (assume 150 interviews for budgeting purposes).

   (b) All members of the experimental group placed in jobs (n=600)

   (c) Immediate supervisor for original placement

   - Control Group (150)
   - Experimental Group (600)

   (d) 50 randomly selected personnel officers from firms employing

CLAUSE I. STATEMENT OF WORK (Continued):

CJMS clients to determine what they think of the CJMS (See Analytic Question (f) under Section B. 1. hereof)

(e) Directors of the placement agencies involved in the experiment (5)

(f) Two (2) placement counselors from each agency (10); these interviews shall address analytic questions (d) and (g) under Section B. 1. hereof

4. Provide answers to the analytic questions set forth under Section B. 1. hereof utilizing the results of the interviews conducted under Paragraph 3 above and the follow-up of job status determined under Paragraph 2. above.

5. Determine the relationship between the independent variables and all postplacement variables (multi-variate analysis shall be used where appropriate)

D. Reports:

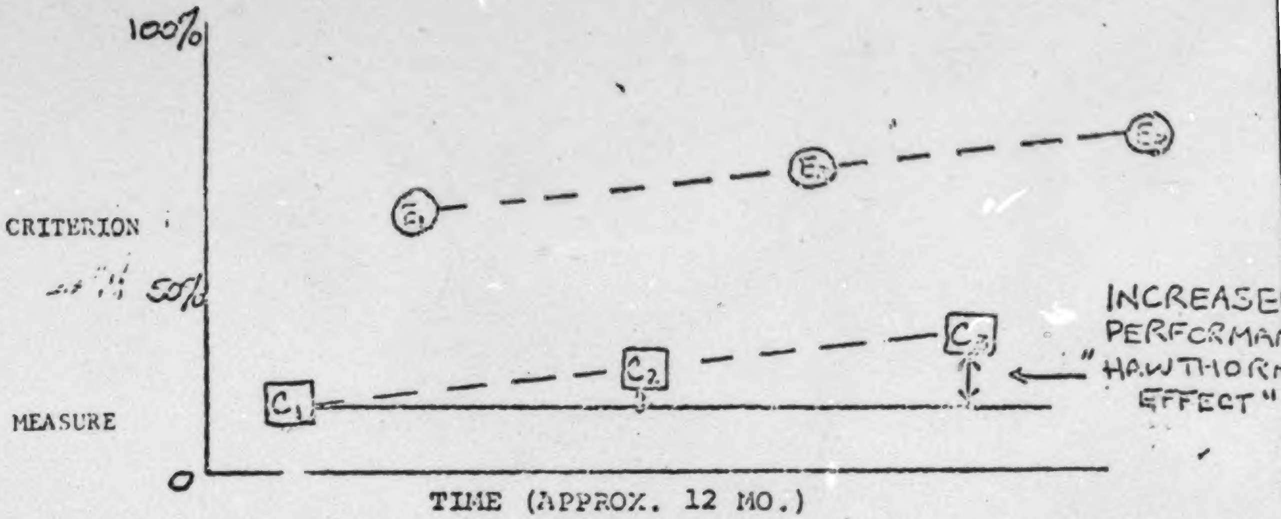
1. If the Contractor's proposal is considered to be an insufficient presentation of the research design, the Contractor shall submit to the OEO Project Manager six (6) copies of the research design (including a detailed presentation of data analysis scheme) as first interim report due July 31, 1972. No further work under this contract shall be undertaken until the research design is approved by the OEO Project Manager.

NOTE: For proposal budgeting purposes, assume this report will be prepared.

2. Progress Report, monthly in quadruplicate by the 15th day of each calendar month, to the OEO Project Manager, detailing the work performed during the reporting period.

3. Interim Report, ten (10) copies, due December 31, 1972 covering analysis of placement activities shall be submitted to the OEO Project Manager. This report should be of such a nature that it can be incorporated verbatum into the final report. Four (4) copies of a draft of this report shall be submitted by October 15, 1972 for review by the OEO Project Manager.

4. Final report, Due May 30, 1973, 75 copies (including one (1) reproducible summarizing the Contractor's total effort hereunder and including its recommendations and conclusions, shall be submitted to the OEO Project Manager. Six (6) copies of a draft of this report shall be submitted by March 15, 1973 for review by the OEO Project Manager to the Contractin Officer.



C_1	E_1	C_2	E_2	C_3	E_3
"Before"	First 3rd	"Between"	Second 3rd	"After"	Third
Controls	Experimental	Controls	Experimental	Controls	
N=200	N=1200	N=400	N=1200	N=200	N=120

Description of experimental paradigm to be followed in collection and analysis of criterion data for individuals processed by CJMS (Exp. Grp.) and not processed by CJMS (Control Grp). Graph lines picture generalized predictions made for differences between experimental and control groups.

Experimental Group: There will be three experimental groups. E1, the first group will consist of every agency applicant meeting both agency criteria and CJMS criteria for placement consideration until 1/3 of the particular agency quota has been met. E_2, the second group will consist of all applicants in the second 1/3, following the "Between" control period. E_3, the third group will consist of all applicants in the third 1/3 following the "After" control period.

These experimental subjects are all those individuals processed through the CJMS by each participating agency and are referred either to jobs or to formal training on the basis of their match to job or training situation. An applicant will be referred only if he shows a Suitability Index of 50 or higher to that situation, and has an Occupational Adjustment Factor greater than 25.

Control Groups: There will be three distinct time-dependent control groups. C_1, the 200 individuals in "Before" use of CJMS. C_2, all 400 individuals between Experience Group A and Experience B processed when no one in a particular agency is being processed by CJMS (System will be shut off) and C_3, the first 200 individuals processed without CJMS immediately following the completion of Experimental Group E_2.

The control subjects must obviously, as a group, have the same demographic characteristics as the experimental subjects and meet the same agency criteria for acceptance as the experimental subjects and who have been processed and referred/placed without benefit of CJMS.

Note: It was decided to have twice the number of controls in Control Group #2 than in #1 and #3 because of the critical nature of these measures and because of different absolute times at which this will occur in the different cooperating agencies and locations.

A second type of control group will be used as well. We will call this an experimental - self - control group. Thi will consist of a small sample of approximately 50 applicants who are indeed placed by use of the CJMS. The background histories of these individuals will be studied in depth in order to compare their life situations up to the time that they were placed to what happens after they are placed.

3.2 Measures Provided By CJMS

1) Suitability of Preference to Experience

2) Difference Index of Preference to Experience

3) Suitability Index of Combined Person Profile to Job Profile

4) Difference Index of combined Person Profile to Job Profile

Criterion Measures

1) % processees referred to jobs

2) % processees referred who are offered jobs for those placed

3) % processees placed

4) % referrals placed

5) % placed who stay on job more than 1,2,3 and six months

6) % placed who are improved in money, status, position

7) Subject and supervisory judgment of job performance

8) Movement from job in which placed into another job with another company where salary is higher or responsibility greater or higher status

APPENDIX E

Instructions for administering the Self-Interview Checklist (SICL) and the Job Outline Checklist (JOCL) prepared by ADP-PDS (November 1972).

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INSTRUCTIONS
for
ADMINISTERING
the
SELF INTERVIEW CHECKLIST (SICL)

ED NOVEMBER 1972

INSTRUCTIONS FOR ADMINISTERING THE SICL

I INTRODUCTION

The "sets of client data" required in the Cleff Job Matching System to match a specific job or job family (cluster) are related to

1. the clients preferences (likes and dislikes)
2. the clients experiences (done and not done).

When the System is to be used by the counselor as a diagnostic tool to aid in determining the vocation best suited for the client, e.g. as in the Vocational Rehabilitation process where most of the clients have physical or emotional disabilities, a third "set of client data" is required. This data is related to

3. the clients capabilities (can do and cannot do).

The first two sets of data - preference and experience- are collected through the use of the Self Interview Check List. (See attachments 1a, 1b, 1c, 1d). During the collection of these two sets of data it is important that the questions be answered based on the client's actual preferences and (past) experiences; no weight or consideration is to be given at this time to the client's current ability to actually perform the activities listed.

II METHODS USED TO COMPLETE THE SELF INTERVIEW CHECK LIST (SICL)

There are two ways of collecting experience and preference data using the SICL. The first, and most desirable method, (standard), is to have the clients describe their preferences and experiences by completing the SICL themselves.

The second method, which is known as the "Direct Rating Format (DRF) of the SICL" should only be used in those cases where it is not possible to use the first method - e.g., the client is illiterate, the client cannot read at the "6th grade level" or above, etc.

III THE READING PARAGRAPH

If the "reading level" of the client is unknown it is first necessary to determine if he or she will comprehend the words and phrases used in the SICL. This may be accomplished by having the client read the "reading paragraph" (see attachment 2a) aloud to the counselor; if the client does not make more than four (4) mistakes the SICL may be (self) administered through use of the standard method. If the client makes five (5) or more mistakes with the reading paragraph the Direct Rating Format of the SICL should be used.

IV SICL ADMINISTRATION - STANDARD METHOD

1. Give the client the blue Self Interview Check List (likes and dislikes) and a felt tip pen or a very soft pencil (#1).

2. Tell the client - "This is not a test - it is a means by which you will describe activities that you like and dislike - and activities that you have done and not done. There are no right or wrong answers and there is no time limit. Work at your own pace."

3. Tell the client - "You will use this booklet to describe activities which you like and which you dislike."

4. Ask the client to write his or her name and the date on the cover and to turn to Group 1.

5. Tell the client - "I want you to read the activities listed on the page yourself as I read them aloud." Read the 16 activities listed on the page to the client.

6. Tell the client - "Now I want you to go back through the 16 activities and this time pick out the two which you like the very most and circle the word most alongside of the activity and cross out the activity ~~like this~~" - (show the client how by demonstration or by referring to a sample). Wait for the client to make the selection.

7. Tell the client - "Now go back through the 14 remaining activities and pick out the two which you like the very least (or even hate) and circle the word least alongside the activity and cross out the activity ~~like this~~" - (demonstrate). Wait for the client to make the selection.

8. Tell the client - Now go back through the 12 remaining activities and pick out the three which you like more and circle the word more alongside of those activities and cross them out - (demonstrate). Wait for the client to make the selection.

9. Tell the client - "Now go back through the 9 remaining activities and pick out the three which you like less than the rest and circle the word less on the answer sheet and cross them out" (demonstrate). Wait for the client to make the selection.

10. Tell the client - "You should have two words in Column One circled, two words in Column Two circled, three words in Column Three circled and three words in Column Four circled, like this." (Show the client a sample). Now tell the client - "Please go back and check you work and then turn the page to Group 2."

11. After telling the client to turn the page to Group 2 and repeating the process - Steps 5 through 9 above - if you feel that the client can continue on alone, allow this but emphasize the following:

    a. Read all 16 activities listed on each page BEFORE circling the selections.

    b. 1. First select the two he or she likes the very most
       2. Then select the two he or she likes the very least (or hates)
       3. then select the three he or she likes the next most (or more)
       4. then select the three he or she likes the next least (or less)

    c. He or she should check the work before turning the page to the next group to make sure the selection is 2-2-3-3.

    d. Tell the client to tear out the instruction page reminder and put it alongside of the booklet and work at his or her own pace.

12. When the client has completed the blue SICL, take it (to prevent copying) and give the client the green SICL.

13. Advise the client that "you have just described the activities which you like and dislike. Now I want you to describe the activities - or activities similar - to those listed in the booklet - which you have done the very most of and the very least of (or those you have never done at all) during the course of your lifetime up to now. This applies not only to jobs you might have had, but also in school, play, at home - as a matter of fact, at any time."

14. Ask the client to turn to Group 1 and you repeat the process - items 4 through 9 above - for the first two groups, referring to activities done and not done instead of things he or she likes or dislikes.

15. While the client is working on the green SICL, you should spot check the work in the blue SICL - any errors detected should be referred to the client for correction.

16. After the client has completed the green SICL you should spot check the work and any errors detected should be referred to the client for correction.

V SICL ADMINISTRATION - DIRECT RATING FORMAT

The SICL is administered "orally" by the counselor to the client. This method requires that every activity (16) in every group (15) in the SICL be rated first on the basis of the client's preference and then on the basis of the client's experience. In other words, you must obtain the client's response to every activity listed in the SICL for both preferences and experiences.

The responses for preferences and experiences will be recorded as follows:

1) PREFERENCES (LIKES AND DISLIKES)

Use the blue answer sheet to record the responses based upon the client's preferences. The response to each activity will be recorded by you, the counselor, as follows:

a) Circle (MOST) if the client would like doing the activity a great deal.

b) Circle (MORE) if the client would like doing the activity a little.

c) Circle (LESS) if the client would somewhat dislike the activity.

d) Circle (LEAST) if the client would absolutely hate doing the activity.

NOTE: If the client hasn't actually performed some of the activities listed, ask the following question - "If given the opportunity to perform the activity, how much would you like or dislike doing it?" Use the response to the question to rate the activity.

2) EXPERIENCE (DONE AND NOT DONE)

Use the green answer sheet to record the responses based upon the client's experience. The response to each activity will be recorded by you, the counselor, as follows:

a) Circle (MOST) if the client has done the activity or a similar activity, a great deal.

b) Circle (MORE) if the client has done the activity a little bit.

c) Circle (LESS) if the client has done the activity a very few times, (once or twice), but never really expects to do it again.

d) Circle (LEAST) if the client has never done this activity, or anything similar to it, at all.

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INSTRUCTIONS

for

ADMINISTERING

THE

JOB OUTLINE CHECK LIST (JOCL)

ED NOVEMBER 1972

INSTRUCTIONS FOR ADMINISTERING THE JOB OUTLINE CHECK LIST (JOCL)

I INSTRUCTIONS TO THE JOB DEVELOPER

Although most employers and job supervisors will find the form of the Job Outline Check List (JOCL) unusual, the majority learn the technique quickly with only a minimal amount of guidance.

In introducing the instrument to the supervisors, several important points should be stressed.

1. The JOCL is an attempt to have the supervisors describe a particular job in a systematic way. It is in direct opposition to the varied, non-uniform job descriptions offered by most employers which, in the final analysis, give no real indication of the type of activities that will be performed on the job.

2. The JOCL encourages the supervisors to give a great deal more thought to the specific behaviors involved in the job they are describing than they probably have in the past. When completed correctly, the JOCL provides us with two vital pieces of data. First, the JOCL profile will show exactly what types of behaviors the applicant must perform in order to do the job successfully, as well as to what degree they must be performed. Secondly, and just as important, the JOCL will show exactly what types of behaviors the applicant must not perform in order to succeed on the job. These are activities which will interfere with good job performance to varying degrees; degrees which are indicated in the profile.

3. With this important information fed into the computer, the preference and experience profiles of job applicants can be compared automatically, resulting in a good match of person to job. Since both the person and the job have been described in exactly the same terms, such a match is a strong predictor of success on the job resulting in the reduction of turnover and greater success for the job applicant.

II ADMINISTRATION INSTRUCTIONS

The following directions will serve as a guide to you for administering the JOCL.

1. Give a JOCL booklet and a package of *JOCL cards to each supervisor. When possible, it is desirable to have two or even three supervisors describe each job. The **green JOCL booklets should be used to profile "white collar" jobs; the **blue are used for "blue collar" jobs.
2. Make sure that each supervisor has a soft pencil.
3. Ask the supervisors to open the JOCL booklet to the first page and read the introduction.
4. When they have all read the introduction ask them to begin reading the instructions as you read them aloud.
5. While reading the instructions, be sure to substitute the actual job title for the word "job". For example, if you were profiling a secretary - typist job, you would read Step #3 as follows:

   > "Decide which two activities most resemble the behaviors most required by the job of a secretary-typist in order to do it best."

6. After you have read the instructions and answered any questions, let the supervisors turn to the first group and begin working. Errors can be corrected by crossing out or erasing.
7. Check each supervisor's work frequently to make sure they are completing the booklet correctly.
8. When the supervisors have finished all ten groups, have them read the card sorting instructions while you read them aloud. Let them sort the card deck and enter their choices in the appropriate boxes on the chart provided in the rear of the booklet. Make sure that only one card is assigned to each relative degree.

* see attachments 1e and 1f

** see attachments 4a and 4b

That is, there should be FIVE definitions entered in the top chart to represent activities which MUST be performed in order to do the job successfully. These activities must be ranked so that one is checked in column 5 as "outstanding", one in column 4 as "very great" and so on down through column 1. The bottom chart must be completed in the same manner to reflect activities which MUST NOT be performed on the job.

9. When this has been completed tell the participants to open their booklets so that the first five groups are visible. Ask them to obtain the algebraic sum of each of the sixteen horizontal rows and write the answer in the space at the right. The $\boxed{\overset{+}{+}}$ equals +2; $\boxed{+}$ = +1; $\boxed{\overset{-}{-}}$ = - 2 and $\boxed{-}$ = -1. To check that this has been done correctly, have them add algebraically the "Group 1 - 5" column at the right. Its sum should equal 0.

10. Have them follow the same procedure for groups 6 - 10.

11. Now ask them to unfold the flap on the last page, and transfer the appropriate dimension scores for groups 1 - 5 and 6 - 10, making certain they enter T-1 in the space provided for T-1, T-2 in the space for T-2, etc.

12. Once again an algebraic sum should be derived and written in the next column.

13. The relative degrees of card scores are entered next, with +5 to +1 placed alongside the appropriate positive definition numbers and -5 to -1 placed alongside the appropriate negative definition numbers. Nothing need be entered for the remaining six definition numbers.

14. A final algebraic sum is taken and entered in the "TOTAL" column. Ask them to obtain the algebraic sum of the "TOTAL" column. Its sum should equal zero. The TOTAL column is the job profile which can be plotted on the graph.

15. After the supervisors have completed the JOCL you should spot check their work, steps 9 through 14 herein, to insure that the JOCL's have been scored properly.

III RECONCILING DIFFERENCES

Our experience has uncovered the surprising fact that some supervisors are uncertain about the kinds of specific behaviors that are required to perform successfully on the job. The JOCL has been constructed to provide information about inconsistencies in this area.

For instance, the algebraic sum of activity groups 1 - 10 might yield a total of +9 for the athletic dimension T-1. This indicates a job which involves the heavy muscles of the body for pulling and pushing. The same supervisor may have chosen the T-1 card and assigned it a value of -5 (highly interfering). Obviously, this supervisor either did not understand the instructions for completing the JOCLs, the dimension definition, or is uncertain about the need for athletic activities on his particular job. When something like this occurs, it is helpful to point out the inconsistency and try to resolve it by gently probing the supervisor about the job which is being described. Find out exactly how much athletic ability is required and make an appropriate adjustment in the T-1 dimension.

When two or more supervisors are profiling the same job, you may find that each looks at the job from a slightly different viewpoint. This occasionally leads to discrepancies in the profiles which should be discussed with those involved until and agreemtn can be reached. When scores for a particular dimension are within three points of each other (in either direction), a straight average can be taken for the final job profile.

APPENDIX F

A document prepared by ADP-PDS, Inc. describing the interpretation of the results of the CJMS and its use in vocational guidance and placement. (November 1972)

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Interpretation of Results of the Matching Process

and

Vocational Guidance and Placement

with the

CLEFF JOB MATCHING SYSTEM (CJMS)

ED: November 1972

INTERPRETATION OF RESULTS OF THE MATCHING PROCESS AND VOCATIONAL GUIDANCE AND PLACEMENT WITH THE CLEFF JOB MATCHING SYSTEM

INTRODUCTION

Vocational guidance - helping someone to make a vocational decision and prepare himself for that vocation - is a personal and critical service. It is obviously most critical for those individuals whose areas of vocational choice have been limited by some physical, emotional, or cultural incapacity. There is little doubt that successful and satisfying work experiences enhance any person's positive picture of himself as an independent, self-supporting and worthwhile member of society.

The vocational counselor's most important characteristic is a strong desire to help others, to be both sympathetic to and empathetic with the needs of his clients. In order to do his job well the ideal counselor also has first hand knowledge of the duties and content of hundreds of different jobs in many settings and conditions as well as experience with a large universe of clients from many walks of life. Through his experience he has learned "intuitively" to match the characteristics of individuals to the demands of jobs and to consider the effects of certain job placements on his clients. As a vocational counselor he serves as a kind of focal point and exchange device between jobs and clients, constantly trying to optimize matches of persons and jobs. Being human, he often suffers the frustration of knowing that - despite his best efforts - mismatches will occur. Sometimes clients refuse to recognize their own best interests, and sometimes the jobs are not what they were supposed to be. The "ideal" counselor knows that coercing a client into a job choice is really a "no decision" which frequently leads to failure.

There are many people with the real desire to help others, with the sympathy and empathy that make this help possible. However, because of the extremely large amounts of time, effort, and money required to gain the depth of knowledge needed about the world of work there are unfortunately very few individuals with the "ideal" knowledge of both jobs and people. In less complex times than our own it was possible for the curious or interested adult to know the duties and conditions of most jobs in a given locale. In these technologically and sociologically more complex times it is well nigh impossible for most of us to know first-hand the actual content of more than a few handfuls of real jobs. The U.S.E.S. Dictionary of Occupational Titles lists and briefly defines over 35,000 job titles. And the list changes and grows rapidly to reflect the technological changes in our society.

It was to help solve this perplexing problem of complexity that the CJMS was developed. The system makes it possible to explore, via the computer, the thousands of jobs which may be available to a job seeker. Trained "Job Catalysts" develop job profiles in the CJMS language on the actual job site; these 16 point profiles are then "stored" in a Job Bank in the computer where they can be searched for the best possible matches to job seekers' profiles, which are independently developed. The keystone of CJMS is a "behavioral language" which describes both person and job in precisely the same set of sixteen behavioral categories. Individuals are described in terms of the kinds of activities they approach or avoid, and jobs are described in terms of the kinds of behaviors an incumbent should approach and avoid in order to meet job requirements. We call these sixteen kinds of behavior the "Dimensions of Work".

Each person's profile is a unique combination of these Dimensions of Work and represents his individuality. The job profiles picture the unique qualities of the many jobs. In a sense, the computer performs the laborious clerical and searching functions which take up so much of a counselor's time, permitting him to exercise those qualities of human understanding which no computer could ever perform. The computer is a filing cabinet which stores the collected information classified in terms of the Dimensions of Work. At command, it becomes a "file clerk" and retrieves information for the counselor and client based on their needs and demands, as they describe these needs and demands.

THE LANGUAGE OF CJMS

Because the sixteen part language is essential to the use of the system, both by the computer and the counselor, familiarity with its terms and their meanings is important. It is a simple language which is quickly and easily learned, and rapidly reinforced by use. The guide which follows should be used by the counselor to help him as he works with the profiles of clients and jobs, until it has become so familiar that the guide is no longer necessary.

The human behaviors of CJMS are classified first into three major categories: 1. Thing-oriented, 2. People-oriented, and 3. Information and Ideas-oriented. Each of these three major categories is further divided into sub-categories as defined in the list below. Each sub-category has been assigned a number and a name which attempts to connote the general meaning of that kind of behavior.

T - Thing Oriented Behaviors

Job activities which immediately and directly involve the worker with things such that:

T-1 Athletic
- uses the large muscles of the body in hard physical labor
- pays attention to broad overall results only

T-2 Utility
- helps others by doing unimportant things to save their time and energy
- acts in response to some immediate demand by someone else

T-3 Fine Manual
- uses fingers in close coordination with the eyes
- pays attention to details and small things

T-4 Gross Manual - Independent
- applies some skill in the use of hands, tools, or machinery
- is relatively free from detailed supervision by procedure, supervisor or machinery

T-5 Gross Manual - Dependent
- applies little skill in the use of hands, tools or machinery
- is dependent on detailed and close regulation by procedure, supervisor, machinery or assembly line

T-6 Order
- puts things where they belong
- cleans or tidies things
- lubricates things

T-7 Correction
- corrects the quality in own work or in the work of others
- ensures quality performance of machinery and equipment

T-8 Locomotion
- drives or operates mobile vehicles
- operates equipment mounted on vehicles
- physically moves away from work space a good deal

P - People Oriented Behaviors

Job activities which immediately and directly involve the worker with people such that:

P-1 Attendance
- provides a service completely determined by the employer
- has a very narrow range of decision
- has minimal and superficial contact, never physical

P-2 Physical Service
- gives a regularized service which meets their personal needs or demands
- is permitted a relatively wide range of decision within specified duties
- can have physical contact, but a superficial personal relationship

P-3 Management
- guides, influences, or directs the present and/or future ongoing behavior of others
- takes or shares responsibility for results of that behavior, including their work
- there is high potential for emotional relationships

P-4 Persuasive
- convinces and persuades others to react quickly in some way beneficial to employer
- takes little or no responsibility for future behavior of other persons

I - Ideas and Information Oriented Behaviors

Job activities which immediately and directly involve the worker with ideas and symbols such that:

I-1 Verbal
- uses written or spoken words to represent ideas, people or things
- describes situations and relationships, or solves problems, using words

I-2 Numerical
- uses numbers or number concepts to represent ideas, people or things
- describes situations and relationships, or solves problems, in numerical terms

I-3 Clerical
- records or orders data of any kind
- processes paperwork intended to do that

I-4 Innovative
- gives a personal interpretation to a situation and finds an artistic, creative or original solution to it or change in it
- expresses some personal idea nonconventionally

Using the Person Profiles

The administration of the Self Interview Check List provides a "Likes and Dislikes" or Preference Profile as well as a "Done and Not Done" or Experience Profile for the usual job applicant. For rehabilitation clients, a third person-profile, the "Can and Cannot Do" or Capabilities Profile is also developed. The administration of the "Can and Cannot Do" evaluation provides an opportunity for client and counselor to consider together, and to compare, their perceptions of the client's disabilities from a job-functioning point of view. Because this evaluation is vocationally relevant, rather than another review of the client's structural difficulties it should help direct his thinking towards those kinds of activities he is capable of doing. And since this is done in terms of activities related to success in specific vocational areas, it should enhance the client's view of his own possibilities. The search of the Job Bank's profiles with the three personal profiles will produce matches at different levels to specific jobs, taking into account his preferences, experiences, and capabilities.

Interpreting the Person Profiles

-- Likes and Dislikes (Preference)

Extreme scores of any kind always provide more information about a person than do average scores simply because they indicate how a person differs from most other people. These discriminable differences are the traits and characteristics we usually hold so important to our individuality and self concepts. In the Person Profiles any score which falls between +5 and -5 can be considered both a group and individual average, or natural characteristic of the person's preference.

1. Go down the list of positive scores over 5. These indicate the kinds of behaviors the client probably likes the most. Certainty about behavioral preference increases with the size of a Dimension score. For example, a score of +15 on T-1 - Athletic suggests a high certainty that the client does like to engage in large muscle, high energy expenditure activities. With a score of +7 there would be less certainty. A score of +22 would indicate a very high degree of certainty.

The same generalizations hold true for negative scores. These indicate the kinds of behaviors and activities the client likes the least. The greater the size of the negative score the more certain we can be that it represents a **"real aversion"** for a particular Dimension of activity.

2. Another kind of extreme to look for is in the total pattern of scores, the profile. Some profiles are extremely flat - with all scores between +5 and -5. A person who produces a flat profile is saying in effect, "I don't particularly like or dislike any kind of activity," and therefore is not motivated in any particular direction. The general counseling problem is to help the client form some sense of direction for himself and to make a choice of job or training. The counselor's continuing approval and support for an area the client does choose is usually necessary to assure continuity of effort in that direction.

On the other hand, some profiles are all peaks, both negative and positive. This type of person is saying in effect, "I am very sure about what I like and don't like", and therefore strongly motivated to go in some directions and just as resistant to going in others. The general counseling problem is one of providing rational forethought and restraint, getting the client to "slow down" long enough to take some long term objectives into account in his vocational planning.

For most clients you can expect 2 to 5 high negative and positive peaks, 2 to 5 moderate peaks, the remainder falling within the neutral zone.

3. Apparent conflicts of interest may also show up in a preference profile. That is, there may be two or more high scores which seem to be mutually exclusive, either negative or positive. Sometimes there is a high positive score which appears to contradict a high negative score. For example, a profile may indicate a strong preference for T-1 Athletic and for I-3 Clerical. The first is a large-muscle high-energy expenditure Dimension. The second is concerned with ordering information and ideas and is usually done in relatively sedentary low-energy expenditure situations. Because these tend to be mutually exclusive people usually satisfy one drive in work and the other in play if they have this kind of interest conflict. Suppose a profile shows a high preference for P-4 Persuasive and dislike for I-1 Verbal. How does one persuade others without the use of words? Though it can be done, it is highly unusual. The need to explore these kinds of contradictions with the client is obvious and can lead both him and the counselor into important decision paths.

It is very important that the conflicts indicated or suggested be reviewed with the client so he can be helped to work out for himself the understanding and re-ordering of the preferential priorities necessary for vocational choice and development. It is often enough to help him recognize that the conflicts do exist, to identify them specifically, in order to help him take into account these things in his vocational planning. In the exercise below these factors will be discussed in greater detail and depth.

4. Preference Profile Interpretation Exercise

Let us consider the following profile of a young woman:

Likes - Dislikes Profile   Miss Mary X.

T1-Athletic	-25
T2-Utility	- 8
T3-Fine Manual	+15
T4-Gross Manual Independent	+ 3
T5-Gross Manual Dependent	-18
T6-Order	-21
T7-Correction	- 5
T8-Locomotion	+10
P1-Attendance	+19
P2-Physical Service	-10
P3-Management	-15
P4-Persuasion	- 7
I1-Verbal	+24
I2-Numerical	+19
I3-Clerical	+11
I4-Innovative	+ 7

A. First examine the aggregate pattern of her preference profile. For thing oriented activities her scores are mostly neutral or negative and the same is generally true of her People oriented scores. Yet, all of her Information/Ideas oriented scores are positive. From an overall point of view she prefers intellectual activities to either social or concrete world activities. Drawing some tentative first hypotheses about her as a person we might guess that she is a thinker rather than a doer, perhaps a little withdrawn from the outside world and somewhat "bashful" with people - which is often called "introverted".

B. The picture of Miss X takes on some form and color when we consider her individual Dimension scores: with strong positive interest in Fine Manual, Attendance, Verbal and Numerical kinds of activities; moderate interest in Locomotion and Clerical activities. She shows a strong aversion for Athletic, Gross-Manual Dependent, and Order; and a moderate disinterest in Utility., Service and Persuasion. Notice that with the exception of a moderate liking for Locomotion, all of her positive preferences are for relatively sedentary and passively oriented kinds of behavior while her dislikes include most of the more active outgoing kinds of activities. We might guess that she satisfies her needs for aggression in her driving of cars and in some "creative"activities.

C. Her overall pattern of many positive and negative peaks, with only four neutral scores, suggests that Miss X is fairly firm in her likes and dislikes. Though externally on the passive side, she is relatively certain that this is the way she wants it to be. It would probably be quite difficult to make changes in her self concept or to get her to take training or a job which demanded an aggressive outgoingness such as managing a custom dress shop, or even being a housewife, which requires Management, Service, and Order kinds of activities which might be difficult for her to accept. We would expect her to defend her relative passivity with some stubbornness.

D. What conflicts are apparent in her Preference Profile? In general the pattern is non-contradictory. Even her liking for locomotion - the vehicle moves - is essentially sedentary in nature. The positive Innovative score suggests that she "locomotes" in fantasy or artistic behavior. It should not be difficult to match her into a job which satisfies both her preferences and aversions.

--Done and Not Done (Experience)

The Experience Profile indicates the relative degree to which a person has actually engaged (or avoided engaging) in each of the Dimensions of Work - according to their own report on the Self Interview Check List. We can never be absolutely sure of the exact degree to which these scores represent the person's true history. We can be highly certain that it is a better account of real activities history than is the Preference Profile. The Experience Profile summarizes what the client says he has done and not done, in terms of the Dimensions of Work. It is always useful to review, if possible, the responses of a client in discussion with him.

Just as it is helpful to view the Preference Profile as a picture of what the client believes is ideal for himself, we may consider the Experience Profile as picturing his perception of what has been real in his activities history. Though the same analytical suggestions for interpretation of the Preference Profile apply to the Experience Profile, it is important to make this discrimination between the "ideal" and the "real".

1. Note the extreme Dimension scores. The greater the absolute value of a score, the more likely it is that the client has indeed engaged or avoided that kind of activity.

2. Look for extremes in profile pattern. Inference and interpretations are analogous to those considered for Preference Profiles. The flat profile indicates a person who has had no definite directions to his life and probably needs help in setting direction. The profile with many very high positive and negative scores suggests a person who has aggressively pursued certain directions and just as aggressively avoided others. Both types of extreme patterns usually have difficulty finding vocational opportunities which completely satisfy them.

3. Conflicts and contradictions can show up in the Experience Profile, too. Since these represent real-life situations theyare much more difficult to resolve in counseling because they are less susceptible to intellectual and rational manipulation and compromise. A person may drop or de-emphasize a wish found inappropriate with guidance and help, but it is impossible for him to "drop" or eradicate a real set of experiences, though he may change his perceptions of those experiences. Contradictions in activities done and not done present a very real challenge to the client and counselor. The mutual examination and careful review of the profile and its implications for the client makes a helpful basis to counseling.

4. Experience Profile Interpretation Exercise

Let us consider the following Experience Profile of the same young woman:

Done and Not Done Profile   Miss Mary X

T1-Athletic	-22
T2-Utility	+ 4
T3-Fine Manual	+20
T4-Gross Manual Independent	- 6
T5-Gross Manual Dependent	- 6
T6-Order	-12
T7-Correction	- 7
T8-Locomotion	+ 5
P1-Attendance	+18
P2-Physical Service	-10
P3-Management	-15
P4-Persuasion	+ 5
I1-Verbal	+18
I2-Numerical	+25
13-Clerical	+22
14-Innovative	- 4

A. The aggregate pattern, considering only the major categories, is much the same as for the Preference Profile. Her tendency has been to avoid thing-oriented activities and people-oriented activities as well; and she had engaged largely in Information/Ideas-oriented behaviors.

B. With the same kind of extreme scores, the overall pattern of variability suggests what we inferred from the Preference Profile. There appear to be some strongly fixed behavior orientations which are probably not likely to change much in which she moves behaviorally. The most likely changes are those which would enhance the degree of already discriminated directions.

C. She has no readily apparent contradictions or conflicts in the Experience Profile. Those suggestions of possible conflict which appeared in the Preference Profile are apparently resolved in her Experience Profile.

Comparing the Preference and Experience Profiles

The computer terminal printout provides a summary score called "Occupational Adjustment Index". This is the product--moment correlation of the two profiles, thus serves as an index of the relationship between the two. The score can vary from a -1.00 to a +1.00. Our research has found that for a large group of semi/low skill employees with demonstrated job stability the average range of this index was from +.40 to +.75 while for a group with demonstrated instability this index varied on the average from -.35 to +.35. Other evidence in addition to the foregoing has led us to conclude that the Preference to Experience correlation is a reliable indicator of "Occupational Adjustment".

In more common sense terms we can assume that a person who habitually does what he does not like, or avoids doing what he likes or further has difficulty adjusting his environment to meet some of his important likes and dislikes, can be termed "Occupationally Maladjusted". And we assume that the inverse is true of the "Occupationally Adjusted". Many factors may lead to or cause occupational or behavioral maladjustment - cultural and environmental forces may have deprived an individual of opportunity or by conflicts of personality forces within himself. Obviously occupational maladjustment must be explained as the result of a complex interaction of both personal and environmental factors. The CJMS has attempted to take these ideas into account in an operational model without putting the "Blame" either on the environment or the person, and attempts to readjust the relationships between preference, experience and job requirements to provide the individual with optimal opportunity for successful interactions with his vocational environment.

In using CJMS, the counselor can observe the following rules of thumb about the "Occupational Adjustment Index". Any score below +.25 is a strong indication that the client may indeed be occupationally maladjusted and is in need of special attention in the job matching process as well as of counseling help.

A client with a low Preference to Experience index should not be referred into a job or type of job unless his Person to Job match index is over +.60. This makes it even more certain that both his preference and experience has some positive relationship to the requirements of the job, thus giving him a chance to succeed at the job and to recover some personal stability. A client with a very high Preference to Experience index can safely be referred to a job where the Person to Job match index is as low as +.40 because he will bring personal stability to the job situation.

Vocational Capability Evaluation

In a rehabilitation setting, where many or most of the clients have some sort of physical or emotional incapacity which can interfere with vocational adjustment, it can be very helpful to administer the Vocational Capability Evaluation. The client and counselor work together to produce a profile which describes the client's relative ability to perform tasks of the kinds delineated in the Dimensions of Work used for the Preference and Experience Profiles. In other words, the capacities and incapacities of the client are described in vocationally functional terms rather than in structural or medically functional terms. Since the "language" is the same in which jobs in the CJMS are described it makes it possible to match clients and jobs on a functional basis as well as on a preference and experience basis.

The same kinds of inferences and interpretations which were drawn from the first two profiles can be drawn here, too, though it must be based on the idea of possible present functioning, rather than on projected "ideal" desires or "real" activities history. As the Preference Profile pictures what is desired or wanted and the Experience Profile pictures the behavioral history, the Vocational Capability Profile pictures what is relatively possible and impossible for the client to actually perform. The very fact that the Vocational Capability Profile is generated by the client and the counselor together, plus whatever other individuals may have an excellent understanding of the client, provides a unique opportunity for client and counselor to work together in the interests of the Client. The objective nature of the instrument provides a medium for the client to gain a more rational understanding, and acceptance of what he is indeed capable of doing and not doing, and it provides a platform for counselor and client to stand together as a team.

How the Computer Helps

Up to this point the computer has been used as a high speed clerk, recording, sorting, typing, making simple mathematical calculations - operations which could be performed by the counselor or assistant, but which would consume hours of their time. The computer operator and her remote slave does all this in about six to eight minutes. Once the Self Interview Check List is scored and the profiles generated, the really helpful work of the computer begins.

The machine computes the correlation between Preference Profile and Experience Profile, the "Occupational Adjustment Index" we discussed above. Then it mathematically combines the two profiles into a single profile which represents an optimal weighting of the two according to a research developed formula. Then it performs the matching of this combined profile to all the job profiles in the job bank by calculating a product-moment correlation for each as well as a difference measure called the "Difference Index". Ordinarily it would take about three hundred hours to perform these operations for a job bank or over 250 job profiles by hand machine calculations - the computer does it in a few seconds.

The correlations, called the "Match Index" indicate to what degree the shapes of the profiles are alike. The "Difference Index" indicates the extent of differences between profiles and helps to break ties among match indexes. For example, if a client's profile matches a number of jobs at approximately the same level of match index, the one with the smallest difference index would be the best match. The computer terminal provides a print-out of the ten or twenty best job matches in rank order according to the size of correlation between client profile and job profile. If a Vocational Capability Evaluation has also been completed, then the computer is required to produce another set of 10 or 20 matches based on correlation of the Capability Profile with the Job Profile. Those jobs which produce the highest profile-to-profile matches on both lists are obviously the jobs for which the client is best suited. This printout of person to job matches also serves as a very useful counseling tool.

Both client and counselor should review the matching printouts, the jobs represented, and all of the other factors involved with getting and keeping the jobs representing them.

This listing should provide valuable and concrete information to the client about the kinds of jobs he can expect, their pay rates, their locations, etc. Most important it supplies a realistic base from which he and the counselor can make their placement efforts.

CLEFF JOB MATCHING SYSTEM

Relationship of Difference Index to Match Index

The column headed "normal range" indicates the expected distribution of Difference Index at the specified Match Index level. If an applicant's Difference Index exceeds the range for a given Match Index, there is likely to be highly significant difference in one or more dimension comparisons, which serves as a "red flag" to the interviewer. The lower the Difference Index for a given Match Index, the less likely is a major dimension difference between the applicant's profile and the job profile.

MATCH INDEX	DIFFERENCE INDEX median	DIFFERENCE INDEX normal range
90 to 94	280	200 - 360
85 to 89	460	340 - 580
80 to 84	640	540 - 740
75 to 79	820	705 - 935
70 to 74	980	850 - 1130
65 to 69	1140	980 - 1300
60 to 64	1250	1070 - 1430
55 to 59	1380	1180 - 1580
50 to 54	1450	1220 - 1680
45 to 49	1540	1280 - 1760
40 to 44	1600	1340 - 1840
35 to 39	1660	1370 - 1920
30 to 34	1710	1410 - 1980
25 to 29	1770	1440 - 2050